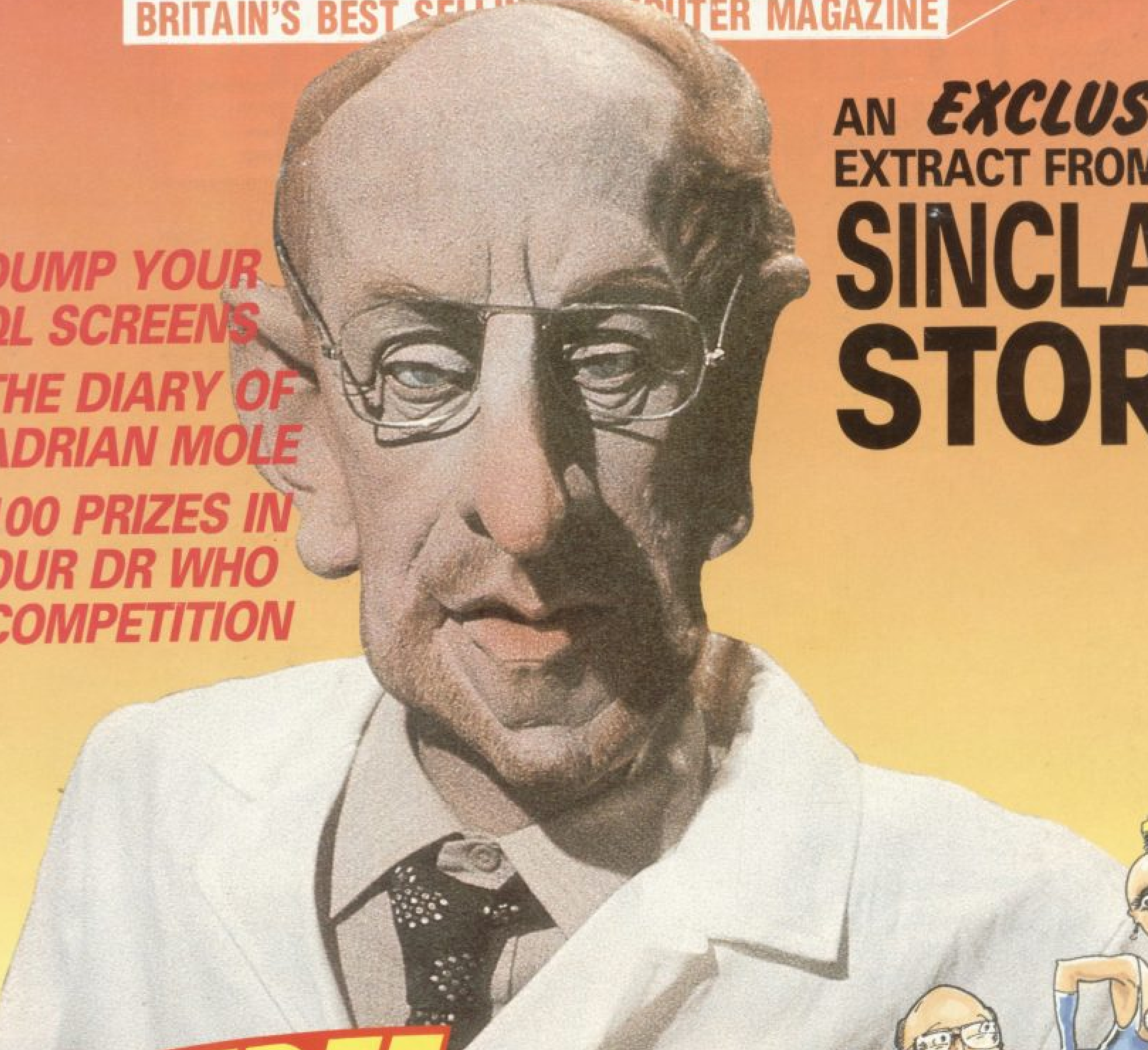
December 1985 No. 45

95p

Mark McGinn

sinclair user

BRITAIN'S BEST SELL… …UTER MAGAZINE



AN *EXCLUSIVE* EXTRACT FROM THE SINCLAIR STORY

DUMP YOUR QL SCREENS

THE DIARY OF ADRIAN MOLE

100 PRIZES IN OUR DR WHO COMPETITION

GIANT FREE POSTER INSIDE

Guess who's been invited to the...

... GREMLIN XMAS BASH! COMPETITION

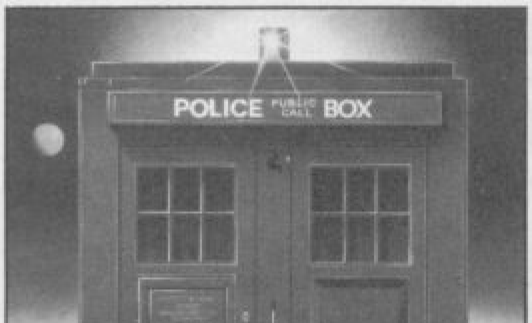


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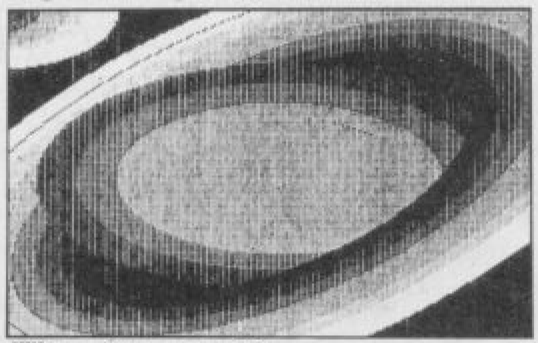
COMPETITION



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The man behind the image, page 78



Belles of St Bride's, page 82

REGULARS

If you would like to contribute to *Sinclair User* please send programs or articles to:
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Original programs should be on cassette and articles should be typed. We cannot undertake to return them unless a stamped-addressed envelope is included. Please write 'Program Printout' on the evelopes of all cassettes submitted.
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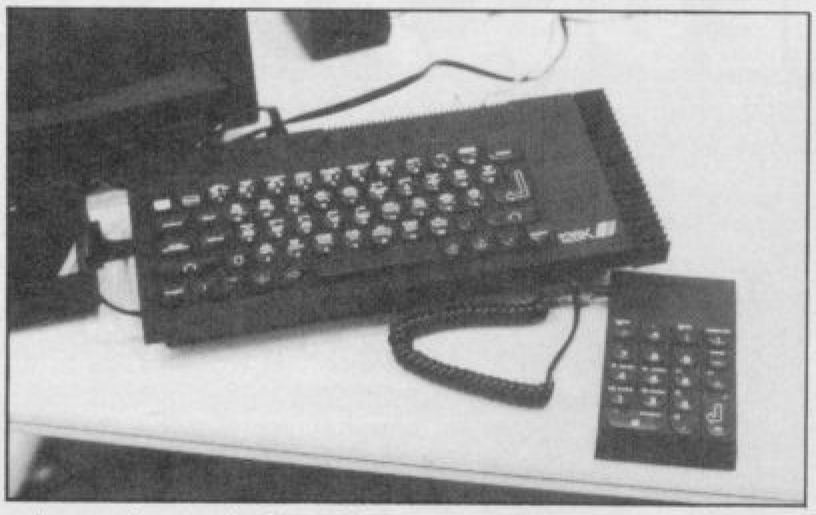
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ABC 102,023 Jan-Jun 1985

128K for Britain?

THERE ARE no plans to launch the 128K Spectrum in Britain this year but Sinclair Research is pleased with the publicity the machine has had from the British press.

Eileen Counihan, spokeswoman for the company, says: "We are quite pleased with the British press. They have at least got the point across that there won't be a 128K in Britain this year. We are not giving any more details and don't want to announce anything until plans are more definite".



British software houses are already being enticed by Sinclair to write for the Spanish market but they have been sworn to secrecy. David Ward of Ocean would say nothing of his plans for the 128 but agreed that events are overtaking Sinclair. "I'm not allowed to say anything about our relationship with Sinclair. It is clear that they wanted to sell off their Spectrum Plus backlog before launching the 128 in Britain. The Spectrum Plus is selling faster than anyone expected. Dixons must be well through the first part of their £10 million order by now. The machines are flying out of the doors".

Dr Tim Langdell, managing director of The Edge, the company which has recently

'It is clear that they wanted to sell off the Spectrum Plus backlog before launching the 128 in Britain'

brought out **Fairlight**, is being similarly tight-lipped. "We have signed a non-disclosure contract with Sinclair. It would seem logical, however, that British software houses are being asked to provide products for the Spanish machine. It's no secret that there are only a couple of software houses in Spain. Britain has been the major source of software in Europe for some time."

We did manage to catch one software house before they were muzzled by Sinclair. Paul Denial, marketing director of Mikro-Gen, says that his company has been approached and that consultative meetings are taking place. "We have had the memory map diagrams and have been promised a development machine, but that hasn't materialised yet. We have been looking into the possibility of adapting our Mikro-Plus games system to the machine. We are looking at the memory maps and there doesn't seem to be a problem."

Denial hopes that the 128K will soon be on sale in countries such as France. "The Spectrum market is still small in France, mainly because it has a different TV system to that of Britain. If you want to run a Spectrum over there you have to buy an interface which costs £80".

Meanwhile, AB Electronics, manufacturer of the Spectrum Plus, has denied reports that it has tooled up for production of the 128.

The company stresses that it has received no orders from Sinclair Research although there are indications that the situation may change in the near future.

Christmas microfair venue

THE CHRISTMAS ZX Microfair will be held on December 14 at the Royal Horticultural Halls, near St. James's Park tube station in London. The doors will be open between 10am and 6pm.

Mike Johnston, organiser of the show, says: "We will have the usual crowd in and it will be about as large as the last one. There will, of course, be a lot of new QL stuff around and I hope that we will see some more QL owners there."



Johnston: 'usual crowd'

Sinclair calls in the receivers

THE C5 HAS survived despite the collapse of TPD, the company which controlled Sir Clive Sinclair's electric car industry.

The business has been plagued by misfortune. In August the C5 assembly line at the Hoover plant in Merthyr Tydfil was closed because, the company claimed, Sir Clive owed £1.5 million for work already completed. That problem was resolved but, because of the high stocks of C5 still available, there are no plans to restart production.

Eileen Counihan, a spokeswoman for Sinclair Research, says: "The name of the electric car company was recently changed from Sinclair Vehicles Ltd to TPD. Although that has been wound up, Sinclair Vehicles Ltd will deal with orders."

TPD was put into the hands of receivers David Sapte and Anthony Locke of Begbies, with debts of £700,000 to 110 suppliers. Counihan says: "Sir Clive's investment in the company was £7 million. It was put into receivership to ensure the future of electric transport. Sinclair Vehicles Sales Ltd will continue to take orders from Britain and abroad."

The C5 has gained more favour abroad than in Britain, according to Sinclair, because of antipathy towards it from the press. Research and development is still continuing although the launches of the C10 and C15 have been delayed.

The C10 is planned as an enclosed two-seater vehicle with a range of 40 miles; the C15 has a similar range but is a four-seater. Sinclair has revealed that development is fairly advanced for both models and that the C15 has already been tested in a wind tunnel.



Clive and C5 in happier days

Surfchamp champs

THE FIRST World Computer Surfing Championships were held at Rossnowlagh, County Donegal, Eire at the beginning of October.

The event was organised by the Irish software house, New Concepts, to tie in with the launch of its revolutionary game, **Surfchamp**, which uses a miniature surfboard placed over the Spectrum keys to simulate the action of surfing. The game is previewed in Software Scene this month.

The competition coincided with the European Surfing Championships at Rossnowlagh, in which 160 surfers participated. Fortunately for New Concepts, County Donegal experienced exceptionally calm seas during the championships, and observers were treated to the unusual sight of dozens of bronzed blond beach boys fighting for a go on the computer as an alternative to the real thing.

The computer contest was won by Jed Stone, the English surfing champion, with a score of 2121. The English team also won the team event.

Norman McMillan, managing director of New Concepts, describes **Surfchamp** as "the first accurate simulation of sport" and has plans for skiing and sailing simulations which further develop the concept of original keyboard overlays.



The English team, winners of the Computer Surfing Championships, and Jed Stone, third from left, winner of the individual event

Surfchamp received a unanimous thumbs-up from the surfers and whole-hearted approval from officials, including Rod Brooks, president of the Australian Surfing Association, and Reg Prytherch, president of the International Surfing Association. All that remains is for New Concepts to convince the fickle public that **Surfchamp** is an exciting absorbing departure in software.

Hardware prices cut by Saga

A DISCOUNT of £10 on the Kempston Centronics E printer interface is available to purchasers of the LTR-1 letter quality printer from Saga Systems.

The offer is available only through Saga Systems. Christopher Smith, sales manager of the company, says: "With the LTR-1 printer costing £119.95, Spectrum owners can obtain letter quality print at prices previously undreamed of."

Saga has also cut the price of its Emperor keyboard by £10 to £39.95. The move comes with the launch of the Saga 3 Elite Keyboard. David White, managing director of Saga Systems, comments: "With our new Elite keyboard and the Saga 2 Profile we can provide keyboards for the Spectrum covering a wide price range and satisfying most demands."

New Sinclair micro — the plot thickens

REPORTS of a new Sinclair 1Mb 16-bit micro, which appeared in a recent issue of *Your Computer*, have been firmly denied by Sinclair Research. The alleged machine is said to be called Enigma, and would incorporate colour monitor, twin 3.5in disk drives, one megabyte of RAM and use the GEM operating system.

"It's conjecture, and bears no relation to any fact", says Sinclair Research spokeswoman Eileen Counihan. "We're a bit worried about the way the story has been presented, with made-up drawings – it's completely fabricated."

'We're a bit worried about the way the story has been presented, with made-up drawings – it's completely fabricated'

Sinclair research makes no secret of the fact that it has been holding discussions with Digital Research about transferring GEM to the QL, or a QL-based machine, but dismisses the present conjectures. The company is also angry at suggestions that the alleged information was leaked.

Your Computer's assistant editor Meirion Jones stands by the story. "It is based on information from inside Sinclair," he says. "A number of people are very annoyed with what's been happening to them there, and are leaking information. I don't see how Sinclair Research can deny the core points made in the story."

The Enigma is rapidly turning into a full-blown mystery.

Lords of BT

BRITISH TELECOM has bought Beyond Software, the company which leapt to fame with **Lords of Midnight** and, recently, **Superman**.

The company was sold by EMAP Business and Computer publications, the publisher of *Sinclair User*, for an undisclosed six figure sum. Bill Delaney, managing director of Beyond says: "We have no qualms about going to BT and are happy that they've taken us on. There won't be any significant changes in Beyond. We will continue with our planned range of products."

Although Beyond has just launched its Christmas range, one of its products, the third in the **Lords of Midnight** trilogy, is missing. **Eye of the Moon** is unlikely to be launched until late spring, next year. Clive Bailey, marketing manager of Beyond, says: "The author, Mike Singleton, is way behind with another game, **Quake Minus One**."

more news on page 13



Down in the sewer

IN THE October *Sinclair User* **Rats** competition we asked readers to work out the least number of rodents which had to be passed by Harris to rescue Hoskins from the rats' tunnels. The correct solution is four rats, and the 100 winners of the competition, who each receive a copy of the classic game, are listed below:

Peter Cawley, Crewe, Cheshire; B J Braybrook, Salisbury, Wiltshire; Kevin Hansen, Kilwinning, Ayrshire; Peter Tong, Paris, France; Scott Deeming, Telford, Shropshire; Jeff Bate, London SW15; Harald Hoftun, Norway; D Briggs, Blackburn, Lancashire; P J Morris, Southport, Merseyside; Robert Anderson, Barrow-in-Furness, Cumbria; G T St Juste, Welling, Kent; Graeme Miller, Milngavie, Glasgow; Paul Forrest, Barassie, Ayrshire; G Waldron, Newport, Gwent; Iaun Rogerson, Lanark, Scotland; John Wills, Coventry, West Midlands; Andrew James, North Shields, Tyne & Wear; Christopher Doyle, Warstock, Birmingham; Pte M A Sellars, BFPO 16; Dave Laybourn, Morecombe, Lancashire; Cpl K Holland, BFPO 16; Steve Davis, Halesowen, West Midlands; Sayeed Ahmed, Luton, Bedfordshire; Alan Mellor, Nuneaton, Warwickshire; Richard Moffat, Ayrshire, Scotland; AC Gibson, Weston-super-Mare; Richard Edwards, Rhos, Clywd; Julian Scott, Smarden, Kent; Ross Hamilton, Stirling, Scotland; Shaun ConCannon, Golborne, Lancashire; M A Hubscmid, Filton, Bristol; Russell Smith, Strood, Kent; C V Stevens, Colerne, Wiltshire; Ian Robson, Warrington, Cheshire; T Crampin, Barrow-on-Humber, South Humberside; Kevin Ferguson, Penicuik, Midlothian; Anthony Gleave, Warrington, Cheshire; D Brewood, Bexleyheath, Kent; David Palmer, London SE6; R Park, Marcham, Oxon; D E Chapman, Holmer Green, Buckinghamshire; D Gourley, Newtownabbey, County Antrim; Kenneth Barclay, Lanarkshire, Scotland; D McNicholas, Wirral, Merseyside; C M Leese, Birchfield, Birmingham; Martin Tidman, Old Windsor, Berkshire; Helen Hamlin, Tunbridge Wells, Kent; Shelby Mount, Preston, Lancashire; P Hannaford, Caerphilly, Mid Glamorgan; David Butten, Southampton, Hampshire; C Hodson, Luton, Bedfordshire; C P Sherwood, Dyfed, Wales; Mark Burrows, Stamford, Lincolnshire; Yuval Ebenstein, Israel; L Levett, London SE28; Martin Chappell, Ilkey, West Yorkshire; Antonio Manuel Domingues, Portugal; William Rowe, Littlemill, Nairn; Christopher Bullen, Hayes, Middlesex; Matti Reinikka, Finland; Piers Coleman, Blofield, Norwich; P T Kendrew, BFPO 45; Matthew Strudwick, Borden, Hampshire; D E Nicholls, London WC1R; F Oattes, The Netherlands; Paul Wallis, Castleford, West Yorkshire; Alan Brownless, Peterlee, County Durham; M J Payne, Portsmouth, Hampshire; Paul Tyrnell, London E4; R A Jasper, BFPO 17; Karl Bell, Eaton, Norwich; Kier Macree, Romford, Essex; N Watts, Neath, West Glamorgan; M J Wright, Felixstowe, Suffolk; R J vd Niet, The Netherlands; David Wilson, Sunderland; Victor Goh Peng Kong, West Malaysia; Kevin Kendall, Ryton, Tyne & Wear; Steven Casbourne, Eaton, Norwich; M Fairless, Newcastle-on-Tyne; Kelvin Butcher, Yeovil, Somerset; Cpl G Wright, BFPO 15; Alan Campbell, Cheltenham, Gloucester; Thomas Barlex, Milton Keynes, Buckinghamshire; Karl Berlin, West Yorkshire; Karen Warnock, Uplawmoor, Glasgow; Richard Shaw, Coshampton, Southampton; David Johnson, Offerton, Stockport; Andrew Phillips, Bobbersmill, Nottingham; B J Dickinson, Rowdenbeath, Scotland; M J Wilkinson, Newton Aycliffe, County Durham; Peter Green, Ormskirk; David Lyon, Ascot, Berkshire; J C Cooper, Falmouth, Cornwall; Jorgen Jacobsen, Denmark; D Bennison, Clifford, West Yorkshire; Paul Storey, Hornchurch, Essex; R Shaw, Nailsea, Avon; D W May, London W4; Malcolm Norman, Newport, Gwent.





Poster Competition

OLD INCORRUPTIBLE Scolding swears by the tradition of inviting the computer press to extravagant Christmas parties and then getting all the hacks legless. Gremlin reckons he lives off a diet of congealed chicken legs and large gin and tonics for the entire season.

So it was a bit of a blow to Mr Grubby Corduroys 1985 when he saw the invite pile this year hardly reached as far as his high score on the **Hypersports** triple-jump . . .

"It's all your fault" howls Bill, tweaking Gremlin's extremely sensitive ear. "I told you to write more about products. You'll just have to hold a party of your own."

So who to invite? Many of Gremlin's favourite victims have joined the great Receivers Office in the Sky, while others cannot be tempted out of their plans for booking a seat on the all-expenses-paid Princess Stephanie Spotters Club tour of Gstaad . . .

Certain necessary evils could not be avoided, which is why you'll see a famous bar-room brawler in this tasteful record of the vivacious throng — Gremlin needed someone to slug it out with any troublemakers . . .

The *Sinclair User* gang are all there of course, though Mike 'boring business bits' Wright couldn't make it — he's still stuck in drive two of his QL looking for his last article, while John '13mm× 60mm×42mm' Lambert is out hunting for the elusive 128. And WPC Fanthorpe and her sweaty advertising team are all having a policy meeting in Tenerife . . .

As usual on such occasions, everyone turned up well after closing time — and a motley crew it was. Gremlin was well blotto by then, but Old Incorruptible is insisting on a list so he knows who to expect return invitations from. Yes fans, it's P45 time for Gremlin unless you can help him out . . .

There were 31 people — or Things — at the party, and Gremlin needs to know their names. Twenty five of them appear in games, and there's five from the office, and another one trying to explain how he really did mean to save Slugger but . . . Write the names on the coupon below, matching them to the numbered diagram, and send it to Gremlin's Christmas Bash, Third Cistern on the Left, *Sinclair User*, Priory Court, 30-32 Farringdon Lane, London EC1R 2AU, before December 20. And look here — all you EMAP slaves, don't try tricking Gremlin with an entry of your own. You're just the types to feed the wrong list to Scolding, you backstabbing undesirables you . . .

In return for this little favour, Gremlin undertakes to reward the first reply out of the hat which has all 31 names correctly given. For every correct name, you'll get a game. Twenty five of the characters left their own games at the party, so Gremlin will send you those, and top up the list with the *Sinclair User* team's favourites. So if you ever wanted to known what Clare 'Ligger' Edgeley plays with in her spare time, now's the chance to find out . . .

Get cracking folks! Gremlin needs you . . . until then, see you on the back page . . . with luck . . .

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Name ....
Adress ....
....
.... Postcode ....

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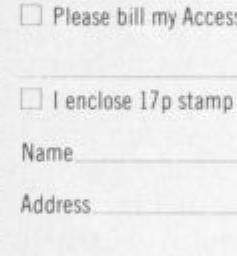
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UTILITIES

MASTER TOOL KIT

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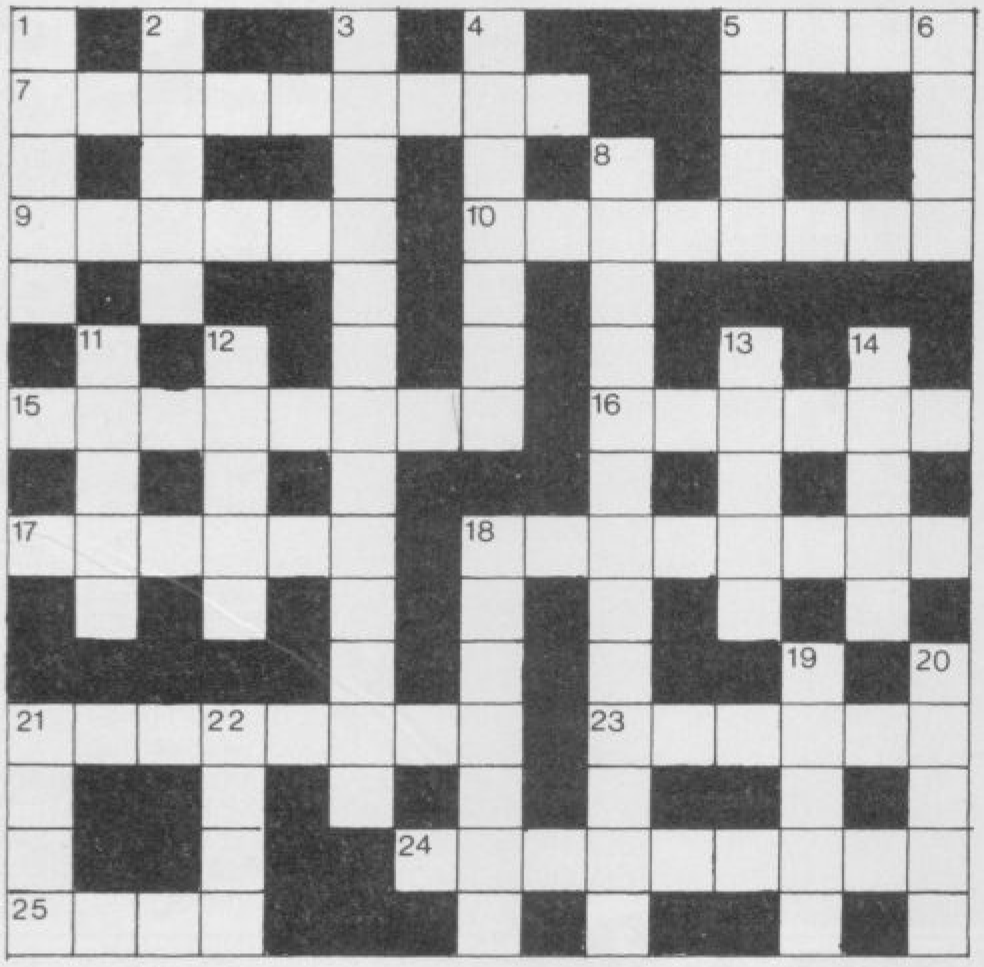
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ZXWORD

by Henry Howarth



Across

5. Some respect an abbreviated technical outline (4)
7 and 4 down. Expanded LAN (5,4,7)
9. Bugs, perhaps, rare at compilation (6)
10. Latency with delay to emit return (4,4)
15. Faked CBE to get information returned (8)
16. BMX loops? (6)
17. Currently it's defined in terms of force between wires (6)
18. Finding the right frequency in tin gun contraption (6,2)
21. Retry equivalent on the QL (8)
23. Sort of portable to overtake the best (3-3)
24. Ferrite stratum of old mainframe memory (4,5)
25. Average number of random multiplications, initially (4)

Down

1. Change later (5)
2. Twenty points? (5)
3. It will be read in a Basic program (4,9)
4. See 7 across
5. Lots are designed for card insertion (4)
6. Once confused a speaker (4)
8. Area in California – 'Si five back-street'? (7,6)
11. Cold start caused by these bugs? (5)
12. Dread awful summer (5)
13. Pictorial representations of coins, perhaps (5)
14. Tape, disk etc, I made obscure (5)
18. It makes the tea in BT (7)
19. A map of the mountains (5)
20. A case of A rather than a? (5)
21. Any C variant can produce blue and green (4)
22. Item in a series on child-birth (4)

solution on page 144

Sinclair knocks all competition for six

SINCLAIR RESEARCH is selling twice as many computers as Acorn and Commodore put together, according to a recent survey by Audits of Great Britain.

Its market share for the four weeks ending September 7 was 56.8 per cent, which is a 20 per cent rise on the last figures published. The bulk of the sales is made up by the Spectrum Plus. The QL lags behind with less than six per cent of sales, followed by other products, such as Sinclair Research peripherals and software, at just half a per cent.



Sinclair: euphoric

Although the Spectrum Plus is top of the league, the QL has made the most dramatic leap in sales. The machine's market share has jumped by just under five per cent after only one week at the new £199 price.

Alison Maguire, marketing manager for Sinclair, says: "These figures, like the latest research from MINTEL, show that far from turning its back on home computers the public is buying almost as many as it was last year.

"Of course the peak buying season is not yet fully underway but AGB's data supports what we have already said, that Sinclair products are what the public want to buy.

'The QL market share is also tremendous and backs our decision to reposition the QL at the new price'

"The QL market share is also tremendous and backs our decision to reposition the QL at the new price."

Despite the euphoria from Sinclair, some of the computer manufacturers mentioned in the survey, such as Amstrad, have dismissed the figures as non-representative. It is easy to see why Amstrad, which got a seven per cent slice of the cake, is upset. The poll covered 57,000 units and was taken from such high street stores as Dixons, Laskys, Rumbelows and John Lewis. It did not include Boots and WH Smith.

Maguire: 'tremendous'



Graphics aid from Psion

A DRAWING package based upon the one used to create the graphics of **QL Chess** and **Match Point** has been launched by Psion.

Q Draw is used to produce low or high resolution graphics using pens of varying thickness together with lines and shapes which can be filled with colour. Drivers for several popular mono and colour printers have been included so that a permanent record of artwork can be kept.

David Frodsham, marketing manager for Psion says: "**Q Draw** started life as one of the many powerful software tools written for Psion's own use, and made possible the complex screens for **QL Chess** and **Match Point**. It was quickly recognised as an invaluable program for screen drawing and design work, which is why we have released it."

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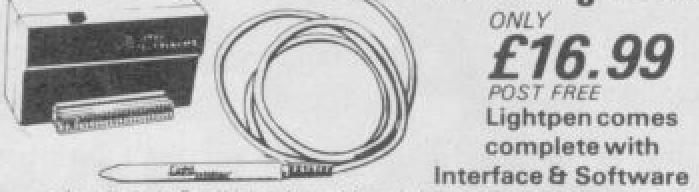


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Cliveophiles rally round

I WOULD like to point out to R A Smith — September letters — that the title of your magazine is *Sinclair User*.

Sir Clive Sinclair doesn't just make Spectrums and QLs but C5s and pocket televisions.

Sinclair User should cover the C5 and any future Sinclair developments to make it worthy of its name.

I agree with Mr Smith that politics should be omitted from *SU* but Sinclair inventions should feature without question. Keep up the good work.

Jean Moriarty,
Meopham, Kent

MAY I be permitted to final comment on the Dietmar Osman — letters, August — saga.

I propose that he should form a society of Latter Day Luddities — there must be at least one other person in the country who would join. They could both ride off in their C5s and drive over the edge of their flat earth.

A Clive fan,
(David Cobbe),
Spilsby, Lincolnshire

● *I think you're rather overestimating the battery range of the C5.*

Very veird reviewers

I WONDER what kind of people you are getting to do the software reviews!

I can't imagine how it is possible to give **Danger Mouse in Double Trouble** as high a rating as your magazine did. The graphics . . . OK, but the game is absolutely boring. And then **Jet Set Willy 2** got only three stars.

In fact, your reviewers must be very veird humans.

Kristoffer Bakke,
Bergen, Norway

● *You have no idea* how *veird . . . A more motley gaggle of life-forms I've yet to clap eyes upon.*

Reliable QL shock horror

I THINK Sinclair Research is doing a great job on their QL, I have found it very reliable and any information I have asked for from them has come first class explaining my problem in full. Sinclair may have made a lot of mistakes in their time but they are getting there. Well done Sinclair I say!

Jonathan Petty,
Washington,
Tyne and Wear

● *I can spot a letter from Sinclair PR when I see one . . .*

Blast compiler a damp squib

IT IS NOT very often that I read something which makes me angry, but Marcus Jeffrey has done just that with his review of **Blast** – October, SU.

The software I received had an errata sheet stating that some commands were not working, and that an updated version would be sent later. After finding that it would not compile a simple ten line program, I requested a refund, but was persuaded to try an updated version.

On receipt I tried once again. This time the program did compile but the runtime was the same speed as Basic. Both versions to P-code and M-code resulted in longer code but no increase in speed which was visible on the screen.

I then tried to compile two Basic programs. The first locked up and the second was even worse. I sent Oxford Computer Systems the program so that they could have a go. It was suggested that I try another version, but at this point I asked for my money back, which I duly received.

I am a serious programmer and **Blast**, or should I call it Phut, was about as much use to me as a hole in the head. What does Marcus Jeffery do – sell cars?

Patrick Norris,
Worthing, Sussex

● *I tested the product on a wide range of programs, of which only one failed. Unfortunately, you didn't mention which version of* **Blast** *you were using. As I understand it, versions of Blast had been sent out prior to the review, and errors were being corrected. Not only would OCS try to compile any program which failed, but all customers would receive version updates as they became available.*

I am told that due to a tape duplication error, a number of copies have been released which incorrectly claim to be version 3.0. Version 3.n will now have been released – still containing one known bug when compiling into machine code – and possibly even version 4.0 which will additionally contain an integer compiler.

Blast *does have its drawbacks, and I would not recommend anybody compiling large programs on a tape system. Nevertheless, at the time of the reveiw,* **Blast** *was the only compiler claiming to be able to handle all Spectrum Basic.*

By the way, is anybody interested in a second-hand Metro? One careful owner . . . Marcus Jeffrey.

Déjà vû for Jet Set Willy 2

IN YOUR November issue I came across some pokes for infinite lives on **Jet Set Willy 2**. I quote: "I have just completed hacking through **Jet Set Willy 2**." Rubbish. It is an exact copy of a program which appeared two months ago in *Your Spectrum*.

Why do people like Gareth Henry recycle old articles and try to make out they devised the whole thing?

Andrew Boucher,
Sawston,
Cambridgeshire

Maintain a good service

IN RESPONSE to your maintenance article in August I'm writing to compliment a repair firm called Capital Computer Services.

I sent my Speccy for repair and nine days later it returned in full working order. Prices vary for different services, mine costing £16.00 inclusive of everything you can think of.

How's that for service?

Ian Fisher,
Barbourne, Worcester

● *Capital. Er . . . what's a 'Speccy'?*

Way of the Yawning Fist

DO YOUR reviewers play the games for just a day? If they do they should try the game again for about three days and I'm sure they would not get into the habit of giving Classics to every game.

When I found that **Way of the Exploding Fist** had received a Classic I rushed out and bought it. The next day I was bored with it. I'd mastered all the moves and the screens are very similar.

The Classic should only be given to games with about three or four weeks lasting interest.

Anthony Bowler,
Hyde, Cheshire

● *Three days? Half an hour between lunchbreaks if you're lucky. Seriously, though – Fist got a weekend of joystick bashing and all I managed was fourth Dan. I think I'd better crawl back to my hovel in* **Dun Darach** *. . . Chris Bourne.*

Lonely ROMs

I'M an Italian boy and I would like some 48K Spectrum penfriends. I'm 18.

Luca Biagini,
Via Roccatagliata 92,
54030 Fossone Carrara, Italy

I AM nearly 13 and own a 48K Spectrum. I am very interested in writing programs and playing games. I would like a pen-pal who I could swap listings with.

Joseph Coleman,
15 Riverside Crescent,
Flowerdale, Victoria 3658,
Australia

I'M A 17 year old Spanish boy with a 48K Spectrum. I would be glad to swap games, ideas, programs and hints with European boys and girls.

Jose Luis Lloret Soler
C/Barranquet 11-4
03000 Villajoyosa, Alicante,
Spain

I AM 11 and I am looking for a foreign pen-pal of about the same age, to swap games and ideas. I own a 48K Spectrum.

Jane Pullen,
6, Walreddon Close,
Tavistock, Devon PL19 8DW

I AM 14 years old, and own a 48K Spectrum Plus. I would like a pen-pal from Portugal, Iceland, Canada or the Middle-East.

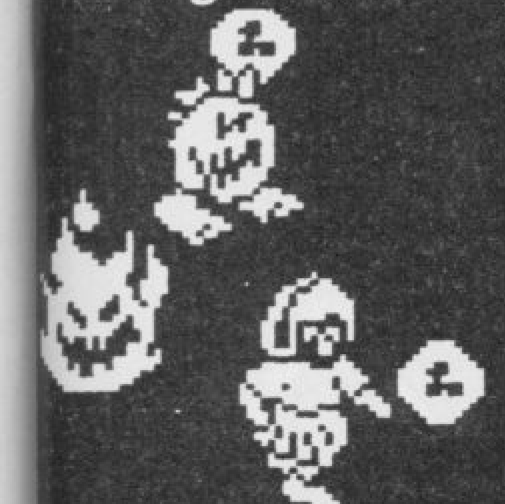
Ian Howe,
33 Throckmorton Road,
Alcester, Warwickshire
BA9 6QB

ANYONE out there willing to swap games, hints or tips. I have £400 worth of software and hundreds of magazines.

Brendan Forde
78 Crawley Crescent,
Hampden Park, East Sussex,
BN22 9RN

Explosion of high scores

Nightshade



HERE ARE some useful pokes: to walk through walls, POKE 58056,0 or POKE 57449,0; for infinite lives POKE 53442,0: POKE 53443,12; to walk through monsters POKE 51105,0 (please note that when this poke is used you cannot pick up any objects but it is useful for mapping out the city).

To bug your mates, POKE 49811,0. When the game starts it will automatically return you to the first screen, making it impossible to play the game.

Robert Sorfleet,
Barnsley, South Yorkshire

Pinball Wizard

YOU may be interested in a few pokes for CP Software's **Pinball Wizard.** They must be entered in the context of the program below.

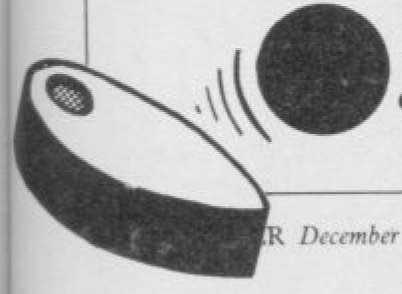
Line 10 loads to a higher address than normal to stop the program auto-starting, and a machine code routine is set up in lines 20-40 to move the program back to its proper address. This only works on 48K Spectrums.

RUN the program then play the tape.

```
 5  CLEAR 60000
10  LOAD ""CODE 33000,
16128
15  Put POKEs here
20  FOR p=50000 TO 50011
25  READ q: POKE p,q
30    NEXT p
35  DATA 1,0,63,17,0,64,33,
232,128,237,176,201
40  PRINT USR 50000
```

POKE 48182,0 for infinite lives/balls; POKE 49054,0 for Bonus resets at 10,000 instead of 1000; POKE 45566,b-1 where b equals the number of balls (maximum=15).

David Powell,
Exeter College,
Oxford



Tapper

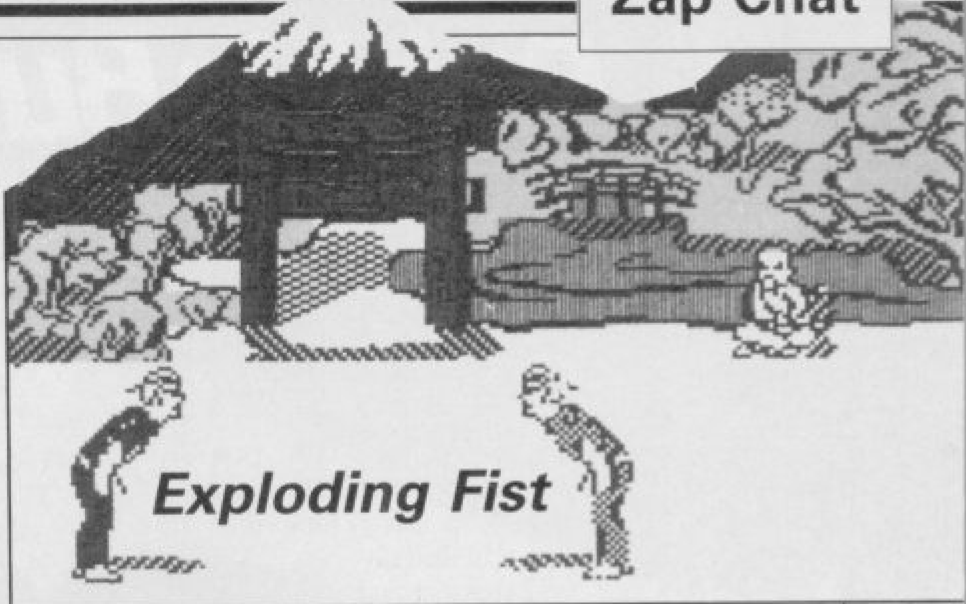
I CLAIM to be the champion with a high score of 408,050. I cleared the punk bar with five lives left.

Daniel Stothardagell,
Sheffield

Kokotoni Wilf

IF YOU are using the Spectrum Plus, pressing True and Inverse Video together on the title screen will transport you to AD1467 with 20 items.

Darren Heaton,
Malvern, Worcestershire



Exploding Fist

I HAVE progressed to the equivalent of 23rd Dan; after that I got fed up and aborted the game. My quickest victory was on 13th Dan, when it took me only six seconds to kill my opponent.

Andrew Marshall,
Grantham, Lincolnshire

SOME HINTS: 1 — 3 Dan, try to do leg sweeps all the time, as they are the most effective and cannot be blocked; 3 — 6 Dan, jump over your opponent and then use either a back high kick or a back sweep — if he jumps over your head you can easily hit him with any forward moves when he lands before you; 6 — 10 Dan, use the same movements as 1—3 and 3—6 above.

After 10th Dan the computer player is just the same as a first Dan.

Really, I think **The Way of the Exploding Fist** is just too easy.

Waheed Ahmed,
Cardiff

MY BEST score is 389,800 on 10th Dan.

J Meadows,
Cheadle, Cheshire

Mr Freeze

ON screen six I cannot get past the first two robots. I have tried jumping over them but I still get iced up. Any tips anyone? Also, does anyone know a poke to slow down the alien in **Don't Panic?**

Andrew Down,
South Chard,
Somerset

Frankie Goes to Hollywood

IN **Frankie Goes to Hollywood**, how do you enter the floppy disc in the computer room? Whenever I enter it, I get the message: 'Disc corrupted'.

Ashley Buckingham,
Tiverton, Devon

Daley Thompson's Supertest

ON THE pistol shooting event I managed to score 64060, which is not possible (though the 6, I have concluded, represents the number of bullseyes).

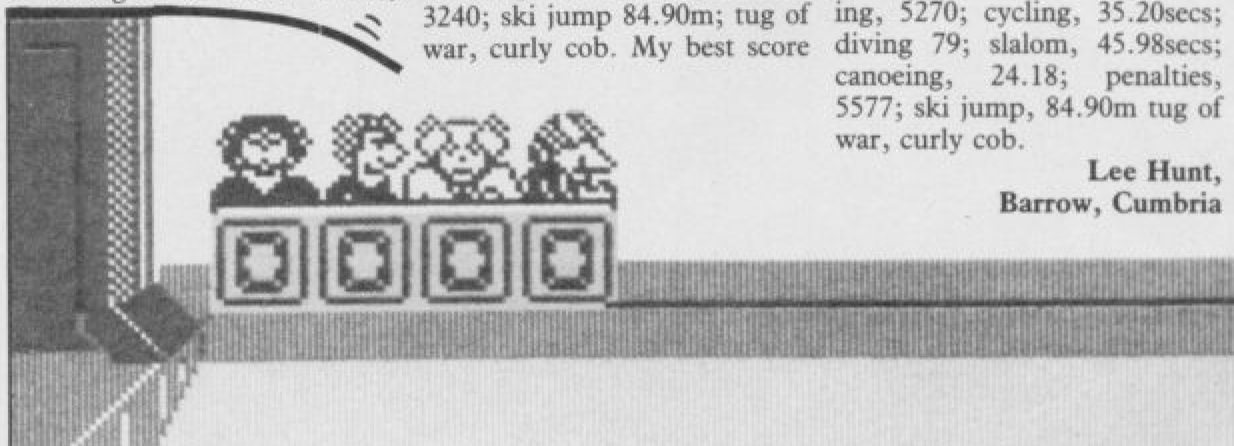
My latest high scores are: (Day 1) pistol shooting, 4840; cycling, 35.06secs; diving, 82; slalom, 46.34secs; (Day 2) canoeing 24.04secs; penalties 3240; ski jump 84.90m; tug of war, curly cob. My best score on Day 1 is 85,740 and on Day 2, 48,705.

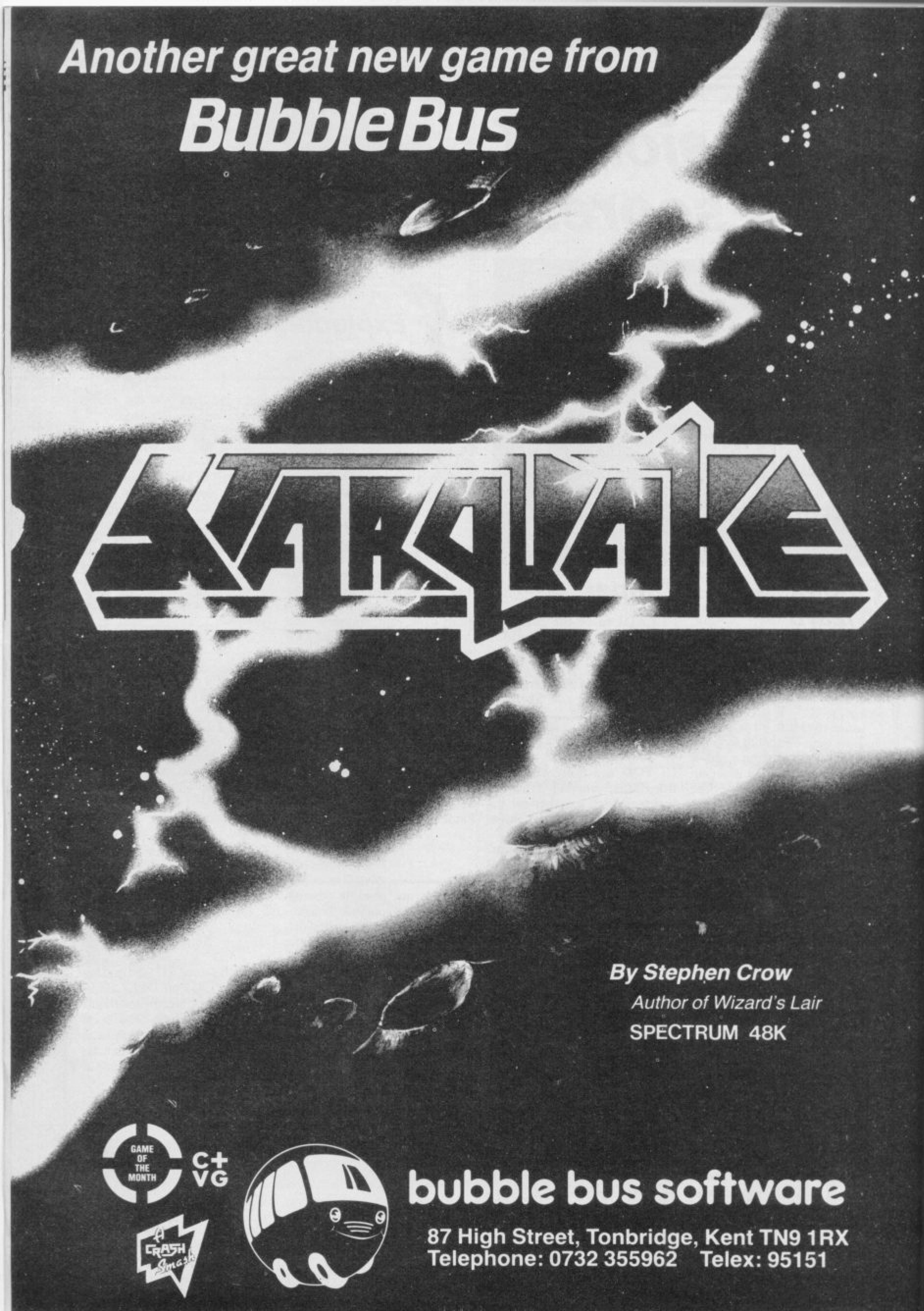
Simon Marks,
Southend-on-Sea



I HAVE scored 111,780 on Day 1 and 115,353 on Day 2. Individual scores are: pistol shooting, 5270; cycling, 35.20secs; diving 79; slalom, 45.98secs; canoeing, 24.18; penalties, 5577; ski jump, 84.90m tug of war, curly cob.

Lee Hunt,
Barrow, Cumbria




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SOFTWARE REVIEWS carry a star rating, the basis of which will be value for money. Programming, graphics, speed, presentation, addictive qualities and the rest are taken into account.

Guide to ratings
★★★★★ 24 carat. Buy it
★★★★ Value for money
★★★ Nothing special
★★ Over-priced
★ A rip-off

Tomahawk

THE AH-64A Apache Advanced Attack Helicopter. Think about it for a moment. It flies at nearly 200 knots maximum. It can climb 1400 feet in a minute. It carries 16 hellfire anti-tank missiles, 1200 130mm cannon rounds, and four pods of 70mm rockets. If that isn't enough to freeze the blood, or rather vaporise it, the pilot's helmet responds to what the pilot is looking at and points the guns at it.

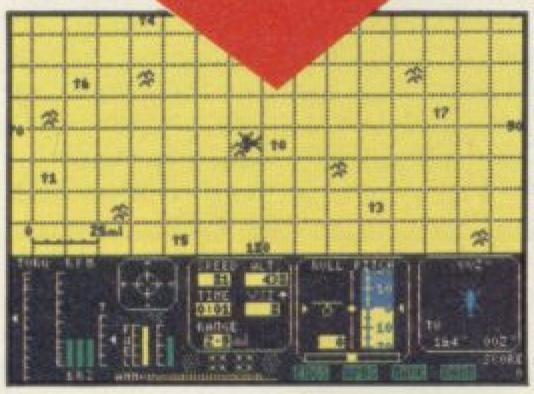
It sounds like an extremely unlikely nightmare, but it's real, and Digital Integration has finally brought out it's long talked-about simulation. **Tomahawk** is the follow-up to **Fighter Pilot**, which we still rate as the best flight simulation around for the Spectrum. But **Tomahawk** takes the genre to new levels of sophistication with a variety of options and levels of violence which will surely delight simulation lovers and militaristic Rambo-freaks alike.

The chopper is easy enough to fly in training mode, but the landscape you see is very detailed, and since helicopter gunships are all about getting down low and hugging the surface, you'll rapidly discover the delights of cruising eight feet off the ground at 100 knots. Trees and buildings are the least of your worries – there are mountains and pylons which present even more hazardous obstacles.

Then there's the enemy. Dotted around the playing area are tanks, field guns, and an enemy helicopter. Once you get into the proper play mode – even as a trainee – life gets hairy as those blaze away at you whenever they can. They also produce rather impressive explosions if you knock them out.

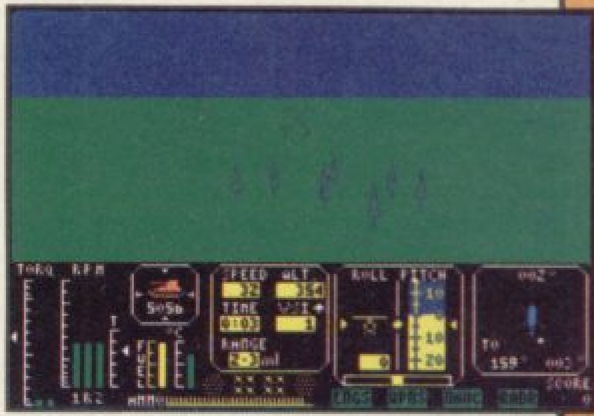
The control panel is fairly cluttered, but you won't need to look at all the instruments all the time. The controls are responsive, and there's a twin joystick option if you want to put all the controls onto sticks.

SINCLAIR USER CLASSIC



Manoeuvres are quite different from flying aircraft. Helicopters tend not to like looping the loop, but the instruction booklet details hair-raising stunts such as torque turn and auto-rotation, where you reduce the revs and drive the rotors with air passing upwards through them. You can even land a helicopter with the engine completely cut out.

Options include four levels of difficulty, day or night flying, crosswind and turbulence effects, and cloud. The last is great fun. You can select a cloud base from 50ft to 1000ft. At 50ft nearly every object on the terrain can only be seen when you're low enough to hit it. On the other hand, it's tremendous fun dropping like a stone out of the sky in front of the enemy to zap him.



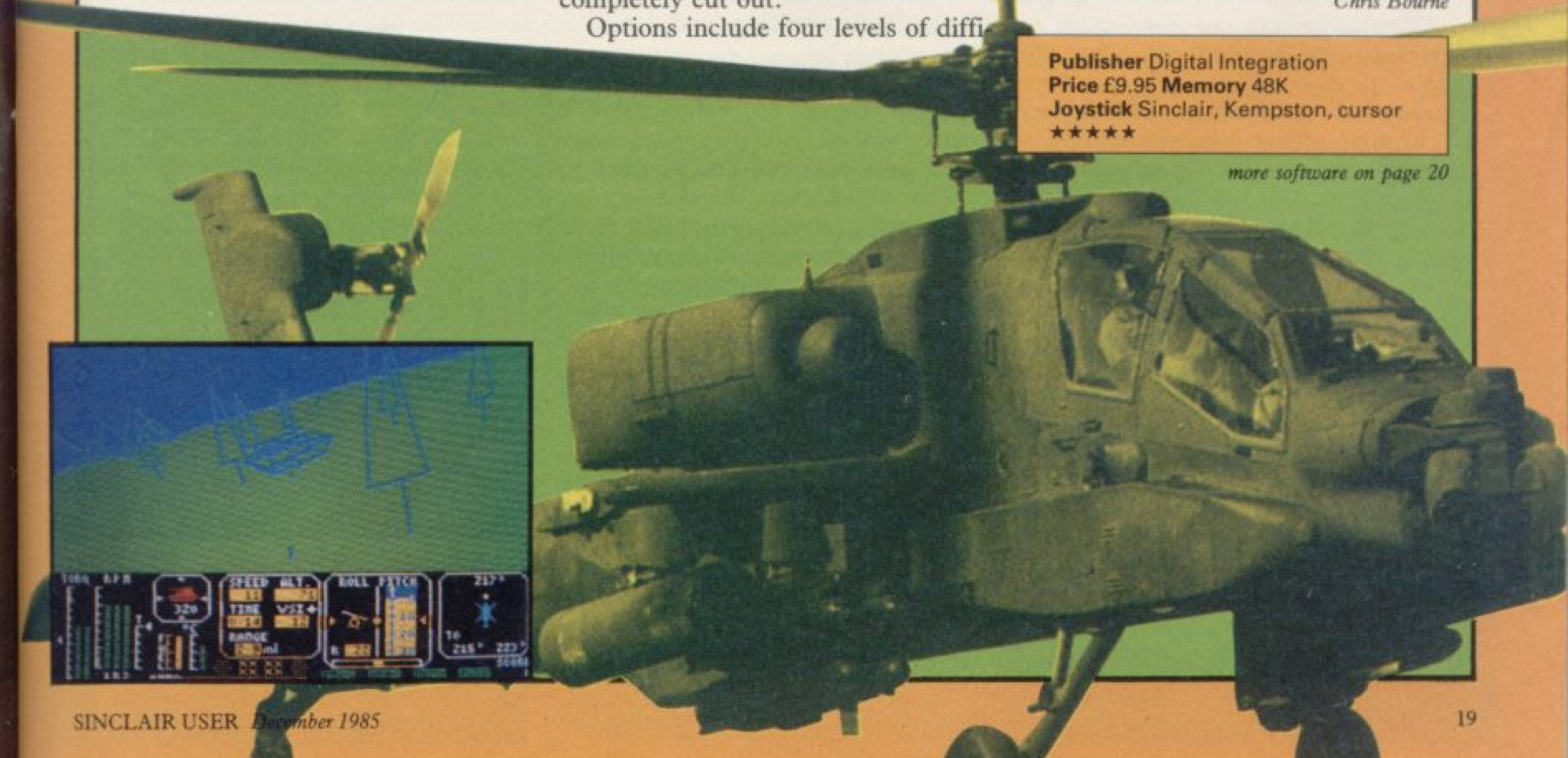
The wireframe graphics are effective and appear well-regulated. Targets appear as dots on the horizon at first, and since there are plenty of bushes and trees about which look identical at long range there's a realistic feel to the business of hunting them out. You'll rely on the cockpit instruments to close in, but once you have visual contact the best tactic is to fly by instinct and keep a sharp eye on the altimeter.

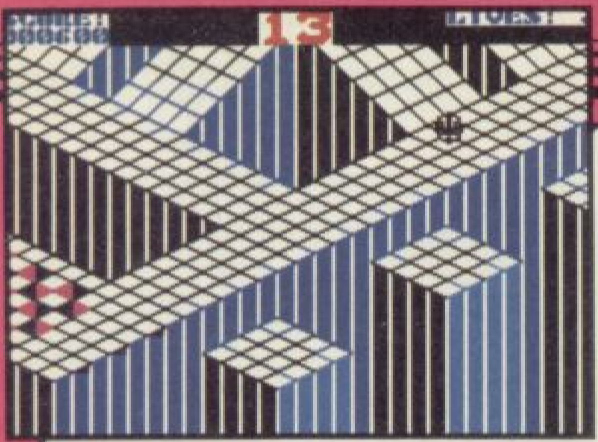
Digital Integration has produced a superb simulation, with plenty of action for games lovers; simulation addicts can forget about the warfare and just slink off to a quiet corner of the map and practise aerobatics and low-level flying. It's the ideal mix, and we recommend it without reservation.

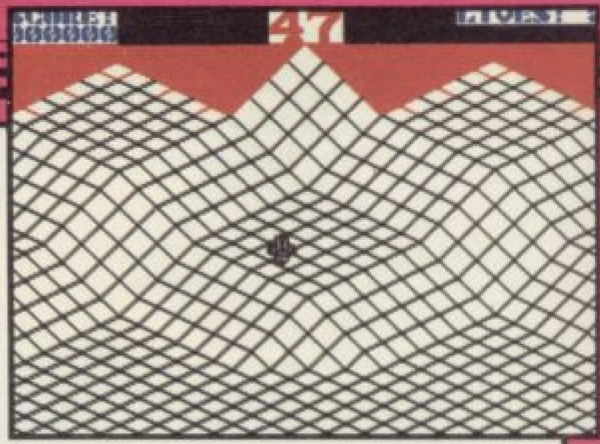
Chris Bourne

Publisher Digital Integration
Price £9.95 **Memory** 48K
Joystick Sinclair, Kempston, cursor
★★★★★

more software on page 20







Gyroscope

THOSE IRREPRESSIBLE Aussies at Melbourne House seem full of arcade games this Christmas, and are just about to release another, in **Gyroscope**.

Somewhat less violent that the last two gladiatorial offerings, it casts you as a gyroscope, that small spinning toy which appears to defy the laws of gravity. You must guide the gyroscope down five four-screen courses of increasing difficulty, avoiding the cliff edges, walls, and various hazards which are set in your path.

Amusement arcade fanatics may recognise it as a version of the successful Atari game, **Marble Madness,** but Melbourne House says there's no connection between the two, and **Gyroscope** is not based on it. Weird — but never mind, it's a remarkably addictive game of great difficulty.

The graphics are really impressive — a 3D landscape of gridded ramps and cliffs along which the gyroscope teeters, speeding up as it goes down hill, running out of steam when climbing. The secret is to build up just the right speed and angle of movement across each part of the course, so as to move smoothly into the next screen without wasting time. But if you go too fast, you'll fall over the edges — and some of the corners must be negotiated with single-pixel precision to stay spinning.

As you progress, the paths become more treacherous. Directional magnets draw you unwillingly towards disasters, while certain sections of track are coated with glass to disrupt your movement. Then there are patches of what Melbourne House claims to be aliens — they chatter at you and bounce you around until, inevitably, it's over the edge again.

There's a time limit of 60 seconds on each spin, so even if you stay out of trouble you have to shift to make it in time. We managed the first run reasonably easily after a bit of practice, but the second is much nastier and the third — well, hair-raising isn't the word.

Luckily, if you lose a life, you remain on that screen, instead of going back to the beginning of the run, so it is possible to achieve some success even if you use up all your lives to do it.

Melbourne House should have another winner on its hands. It seems a pity that only 20 screens could be fitted into the game — but they're a pretty dazzling 20. Whether or not the game is as original as Melbourne House seems to think, we've never seen anything quite like it on the Spectrum. Buy it and go bananas.

Chris Bourne

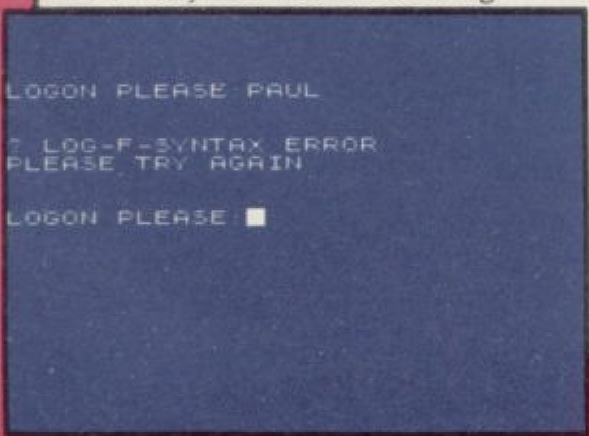
Publisher Melbourne House
Price £7.95 **Memory** 48K
Joystick Kempston, cursor
★★★★★

Hacker

ACTIVISION'S latest may put you in the role of a hacker sitting at your Spectrum trying to break into the local NatWest computer, in a forlorn attempt to raise the dough for a new printer interface, but it's certain no hacker ever encountered what you face.

Hacker contains no instructions. The first screen asks you simply to log-on, but what's the password?

Once you've got through that, which is not too difficult as Activision does most of the work for you, you begin to work your way into a global conspiracy of mad multinationals attempting to take over the world by . . . well, that would be telling.



The game rapidly leaves the hacking environment of bleeps and teletext messages to send you round the world, supposedly as an agent for the bad guys. Essentially it's a strategy adventure, rather than a pure problem solving fix for hackers. **System 15000** it is not – the plot of that classic game was realistic and gripping whereas **Hacker** seems artificial and unbelievable.

Arcade elements creep in once the company begins to realise there is someone messing about with its equipment, and avoiding satellite tracking systems as you piece the plot together will annoy purists but probably inject variety into the game for those with a more limited attention span.

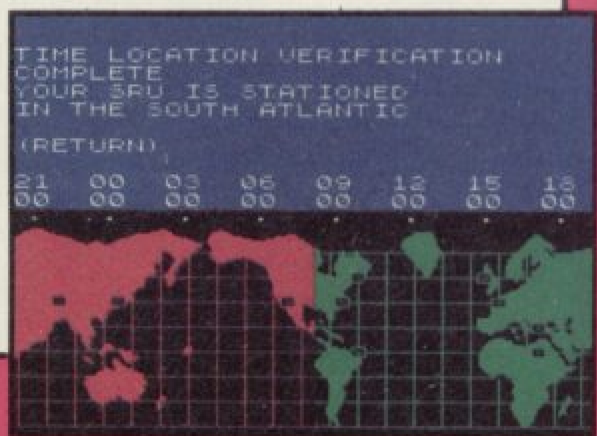
Take notes of everything which happens and you'll find it simple enough to get into the problems posed – but completing them is another matter, and should take much longer.

Obviously, a review of a game which depends entirely on your knowing nothing about it has to leave a lot out. Whatever we write spoils some fun, but on the other hand, once you have penetrated to the main part of the game, it settles down into an unusual type of adventure which holds rather fewer surprises. Activision might have included a few extra events and less information about what to expect – contained within the game – than it has.

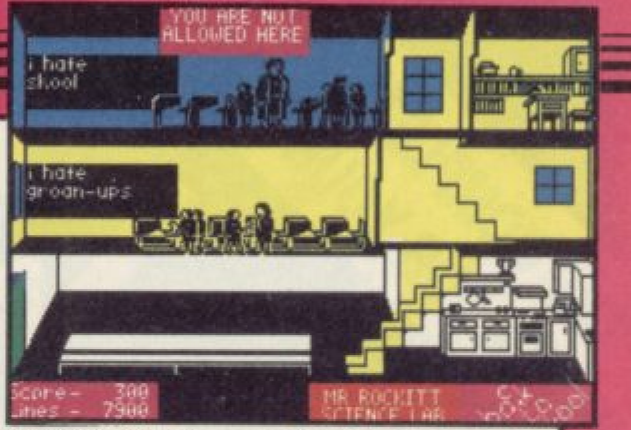
Meanwhile, just because this review is a bit thin on detail, don't be put off **Hacker**. We've left a lot out, and for those who like a bit of strategy mixed up with their adventuring, and aren't too fussed by the rather wild scenario, **Hacker** is good value. It's not as revolutionary as Activision claims, but it's still worth buying for the long winter nights.

Chris Bourne

Publisher Activision
Price £7.99 **Memory** 48K
Joystick Kempston, cursor, Sinclair
★★★★



Back to Skool



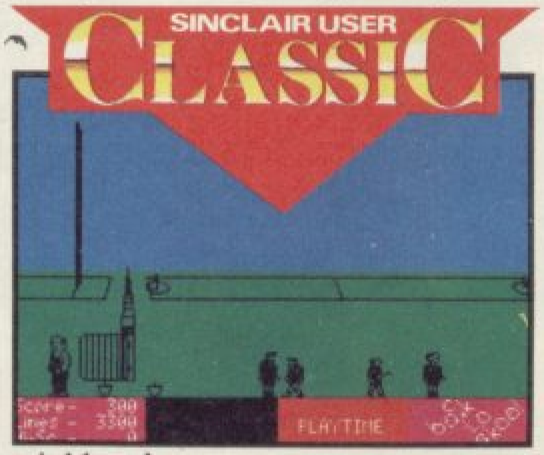
ERIC'S BACK again for a new term at school, and the catapult bullets are flying as thick as ever. In **Skooldaze,** Eric had to steal his rotten report from the Headmaster's safe. Now he's had all summer to forge a new, glowing version. The problem is, how to get it back in the safe again.

Over the break, there've been a few changes at school. The same old masters, Mr Wacker, Mr Withit, Mr Rockitt, and doddery old Mr Creek still dish out the lines as angrily as ever, but the school has been considerably enlarged. There's a girls' school on the other side of the playground, and Eric's got a girlfriend of his own.

And as well as the catapults and good old fistfights, Eric has access to stink bombs and water pistols to create his own special mayhem. All his old friends are there, such as Angelface the bully and Einstein the sneaky swot, and it's as big a riot as the original **Skooldaze.**

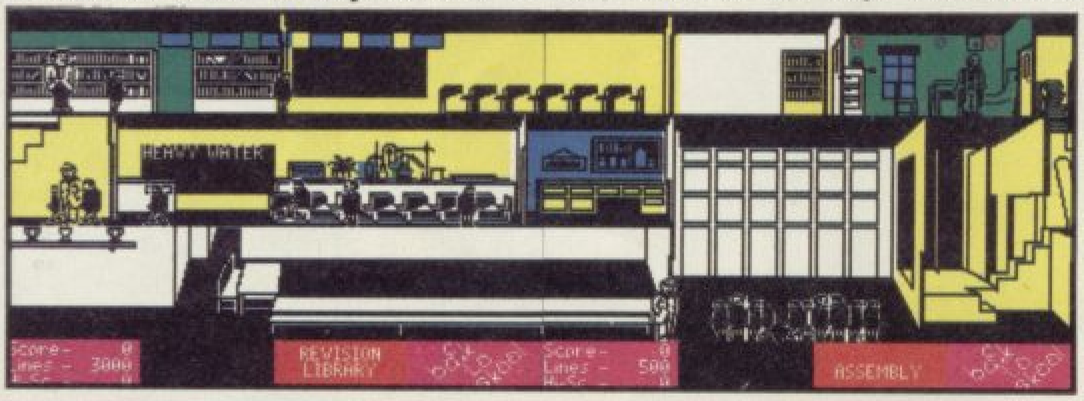
The task of getting the report back in the safe would be impossible if it wasn't for Eric's big brother, who has thoughtfully provided notes on how he achieved the same feat two years ago. It seems you've got to get the masters drunk on the Headmistress' private sherry in order to reveal the combination for the science storeroom where the frogs are kept.

"The gurls' hedmistris hates frogs" says Eric's brother. So nobble the old bat with the frog and . . . ah, but you can't do that unless you have the bike, and the bike's chained to the conker tree, so you'll need to get Mr Wacker to open a window by letting off a



stinkbomb . . .

The graphics are fabulous, still the same cartoon-like boys and masters lurking in the corridors, the same melee at dinner, the same scramble for seats in overcrowded classrooms. But there's more variety on top of that — a much larger playing area, horrible little girls with hockey sticks, an impressive array of impedimenta in Mr Rockitt's laboratory, desks that open now to reveal water pistols and stink bombs, and so on.



Although it's extremely difficult to get far into the quest, that won't stop you having a good time. It's fun just trying to stay out of trouble — if you get ten thousand lines you're expelled, and what with the fighting and timetables to be reckoned with, you're hard enough pressed just to get to your History lesson on time, or make it back to assembly from the forbidden classrooms of the girls' school. Microsphere has taken pity on Eric though — he might persuade his girlfriend to help him out with the lines.

Meanwhile there's Einstein's incredible knowledge of dates to envy, Angelface's knockout fists to avoid, and lots of incidental mayhem to raise a laugh from spectators as well as players.

Chris Bourne

Publisher Microsphere
Price £6.95 **Memory** 48K
Joystick Kempston, Sinclair, cursor
★★★★★

Critical Mass

A DESOLATE asteroid houses an advanced anti-matter conversion plant, set up by an outlying system of the Terra Federation.

A group of aliens has penetrated its defences and has threatened to destroy the plant, turning it into a black hole which would suck thousands of inhabited planets into its colourless void. Your mission is to disable the plant before it achieves critical mass.

At the start of the game a 3D representation of a desert world is panned across the main display window until the dome-shaped hover pod launcher comes into view.

Using joystick or keyboard you must orientate the pod and then press the accelerator. The joystick is easier to use as a simple one way movement is enough to control the craft.

There are five zones through which you must travel. In the first zone you will encounter giant worms and dust balls. In the second zone you will have to contend with alien hover pods as well.

Your pod remains intact while its shield has enough power, but bumping into obstacles and being hit drains



its resources. When your shields drop the pod will implode, and you must follow directions to the nearest pod launcher to collect another craft.

If you manage to get into the final zone the walls of the power plant soon appear. To enter you must disable the protective wall and destroy the source of the energy beam.

The desert world portrayed in **Critical Mass** bears a remarkable similarity to Frank Herbert's *Dune*. Even the hover pods looked like the winged ornithopters portrayed in the film.

John Gilbert

Publisher Durell **Price** £8.95
Memory 48K **Joystick** Kempston, Sinclair, Downsway, Protek
★★★★

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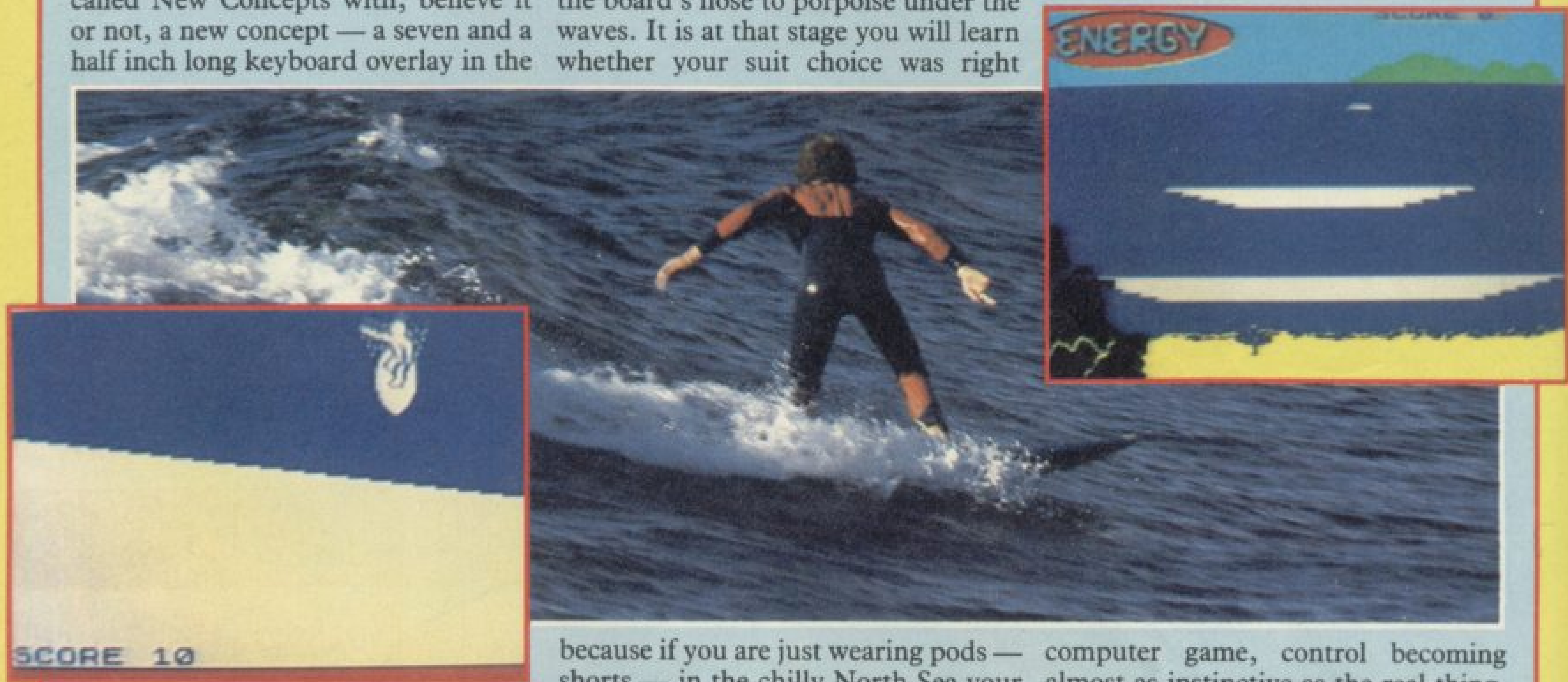
PREVIEW

Surfchamp

HANG FIVE. Hang ten. Hang it all — how does a land-locked Londoner come to terms with the arcane world of surfing? There's absolutely no swell on the Thames!

In Britain, surfing — and we're talking boards that ride the waves, not windsurfing — is such a minority sport as to be almost invisible. It isn't even easy to learn how unless you're lucky enough to live in one or two select spots.

Now along comes a new company called New Concepts with, believe it or not, a new concept — a seven and a half inch long keyboard overlay in the shape of a surfboard for the rubber keyed Spectrum, with a Spectrum Plus version to follow.



At last everyone has the opportunity to ride the wild surf as it rolls in on their television screens. First though, it's worth going through the tutorial side of the tape to learn a little of the history of surfing, the nature of boards and some of the jargon. What is a three fin thruster?

It's worth taking notice because you'll need some of the information when you load the other side of the tape which starts with a report on the day's conditions; air and water temperature, and wind speed and direction. Those will affect your choice of equipment, as will your age, sex and weight. In fact, you'll be learning a fair amount about surfing as you choose the best combination for the conditions.

Now is the time to stow the board on your van and with a cry of 'Surf's up!' its down to the beach, a rocky break to the left, a small island in the distance. This is where the preview copy of the game is most disappointing. While the graphics suffice they are hardly state of the art. However, that is compensated for by what comes next.

The surfboard sits over the keyboard, centred on the letter G. Your hand lies flat upon it with fingers on Caps Shift and 1 for left and right. Walk your stick figure along the beach and press gently on the nose of the board and you're in the water. Next, it's out to where the waves start, paddling left and right and dipping the board's nose to porpoise under the waves. It is at that stage you will learn whether your suit choice was right because if you are just wearing pods — shorts — in the chilly North Sea your energy will drain away.

Found the place? Good, because you are now waiting for the perfect wave to roll by. Choose the optimum moment to press 2 and ride it. Suddenly the screen changes, a much larger sprite surfer silhouetted against a wall of water. Quickly move your hand to the back of the board, apply pressure and you're surfing.

At first you will do well to glide down the face of the water but with time you will learn to manoeuvre and that is when the multi-fin boards come into their own. While those are more difficult to handle you will find they are capable of amazing stunts. Practice is aided by a mode which allows you to switch into slow motion.

While that dinky little surf board could so easily have been no more than a gimmick, destined to decorate the mantlepiece, a lot of thought has gone into simulating reality. No way could mere keys capture the control possible from walking the board. The sharpness of each turn is controlled by careful placing of pressure — New Concepts boasts that no fewer than 20 keys are read. You can even trail your hands in the water.

The gamut of surf stunts is open to you. Start with a gentle turn to ride the length of the wave. Then a 360, turning the board right round. Up the wave again and off the lip, going just over the edge, or most spectacularly of all, an aerial cutback where you shoot off into the air then wrench the six foot board back into the soup.

Did I say six foot? Once you get into this it is easy to forget that it is just a computer game, control becoming almost as instinctive as the real thing. I found myself aiming for longer rides, more difficult manoeuvres. Don't get too absorbed though, because rocks present a nasty hazard for the unwary. Providing you avoid them you can surf till your energy runs out.

A clever system of scoring gives you points as awarded in championships, though out of 100,000 rather than 10. New Concepts is promising a competition for those who can beat the previous best score, which is fun, but even if you can't get as high, I think **Surfchamp** provides an almost unique challenge thanks to that little board which turns Spectrum surfing into something satisfyingly physical.

New Concepts Ltd, 37 Dublin Street, Carlow, Ireland. Tel: 0503 32492/32208.

Jerry Muir

Shadow of the Unicorn

A LONG, long time ago somebody wrote a book full of evil, and then somebody else found it and read it, and all the evil flew out and infected a vast fantasy land, and you've got to make it right again.



There are ten characters to control, but you start with three – King Mithulin, Avarath the Wizard, and Ulin-Gail the Satyr.

Yes, it's that sort of game – lots of strange names and places to explore, all very Tolkienish. You also get to see the latest wheeze from Mikro-Gen, the Mikro-Plus interface which has 16K of the game ROMmed into it.

Most of the extra memory seems to be about having a really enormous playing area. The graphics themselves are not particularly special, but you get attractive views of the land and your characters, which you play one at a time, are animated.

Mikro-Gen seems to have been unable to reproduce the masking effects of **Everyone's a Wally** for the graphics, but the colour-clash really isn't too bad.

It's very much an adventure game on a grand scale. Most of the heroes have objects associated with them – Holdin's Helm, or the Veil of Guinol. Clues to the appropriate use of such objects are to be found in a 100 page novelette called *Shadow of the Unicorn*, written by Dale and Shelley McLoughlin.

The book tells of what happened prior to the adventure. It is particularly helpful in explaining who the various characters are and also filling out places on the map provided with the game – which is neither complete nor entirely accurate.

Characters vary in abilities. Avarath is clearly the most useful to start with, because he can zap the nasties with his magic staff. Unfortunately, he loses energy fast, so he'll have to look out

SINCLAIR USER CLASSIC





for magic bushes and wells to replenish his energy.

Some characters, such as Avarath and Mithulin, are vital to the game and you lose if they die. Others are less important, and serve to protect or run errands for the major players.

Shadow is obviously a big game, and after hours of play we felt we had only scratched the surface. At the price it's clearly great value, since you get the 16K black box and joystick interface thrown in, as well as a novel. Unfortunately, you can only use the interface with the game.

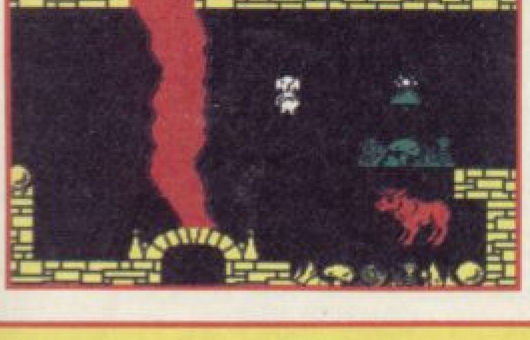
We've given it a Classic after a bit of soul-searching – somehow you expect miracles just because there's some hardware hanging off the back of the Spectrum, and miracles you don't get. But the full quest, if you can fathom out what's going on, is obviously going to take a while to sort out, and the setting is atmospheric and intelligently worked out. *Chris Bourne*

PublisherMicro-Gen **Price** £14.95
Memory 48K + 16K included
Joystick Kempston interface included
★★★★★

Riddler's Den

WHAT HAS it got in its pockets? The answer is important if Trunkie the Manlephant is to find the Great Golden God Gregogo.

You must find the golden tusk. There are four pockets in your elephantine skin to carry four objects.



Some of those need to be placed in specific pockets to work.

All the riddles are solved by placing the right objects in the right locations, and to do that you must read the diabolical attempt at verse.

Unfortunately, some of the rooms are off limits until you find certain objects. The game map is split into three sections. The first, in the middle, contains the objects to get into the right-hand section.

Matching objects and locations is an irritating business and it will take you hours to work your way through the right section of the program.

Riddler's Den is easy to play but difficult to solve. The graphics may look conventional – in the **Atic Atac** mould – but the game has less of the hack and slash that Ultimate has in its products. It is a mind game with



arcade overtones and will appeal to those who have had enough of continual killing. *John Gilbert*
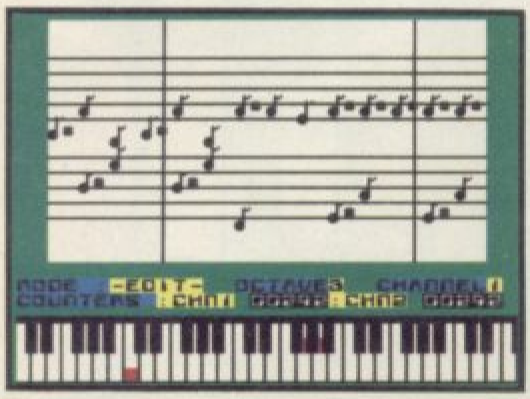
Publisher Electric Dreams
Price £7.95 **Memory** 48K
Joystick cursor, Kempston, Sinclair
★★★★★

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PREVIEW

Wham — the Jukebox

DON'T BE MISLED by the title. Whatever you may think of the pop



group, **Wham — The Jukebox** is as serious a piece of software as **Tasword II** or **The Quill**. It's a music making program, and before you all yawn, listen to this — it's the routine responsible for the sound on **Fairlight** and **Way of the Exploding Fist**.

The preview copy we have lacks some of the frills promised, but it still helps you write music — in two-part harmony. The bottom two rows of the keyboard behave like a piano keyboard and the notes are printed up on the screen as you type them in.

When both voices are written in, you can save to tape, or compile the tune into code with the two-part routines included — the demo tunes included all took up less then 1K, although the finished product will include tracks from Wham.

Tempo can be changed at will, and you can repeat a bass line if you want, to save hours of typing. Other facili-



ties include a drum sound for rhythms, and white noise effects chosen by moving a cursor over a display of various waveforms.

Extras to come, according to Melbourne House, include a printer routine to print your music in proper musical notation.

It's the only music software which allows our resident Bob Dylan to get his magnum opus onto tape in under two hours. To judge by the awesome effect the song had on other members of staff, Melbourne House has a lot to answer for. *Chris Bourne*

Screenplay

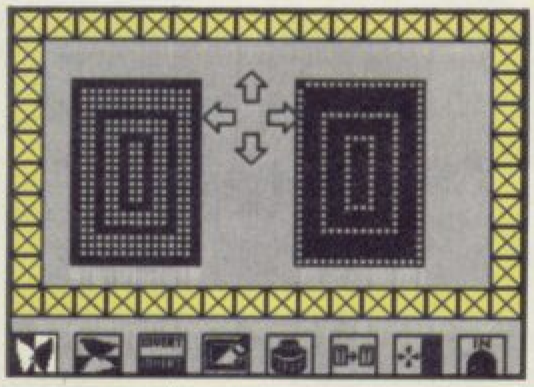
CAMERA, sound, action! Try your hand at being Steven Spielberg.

This utility provides all you need to make your own film plot, music and action. The package is split into departments, the first of which is Wordshot, a primitive word processor into which you type your plot and character dialogue.

Next is the recording of the soundtrack. You can choose the time signature, set for high or low notes, and then compose your tune.

Action involves a complex sprite designer which can create static or two-stage animated sprites.

Screenshot provides a similar facility to that of Action but is used for screen design. The computer allows you to create a set by using a freehand drawing or predifined shapes.



Next, move on to Take One. That is the editing and production department where you put your film together frame by frame. Six frames can be used in each production. When you press the Film Run option you will see your creations come to life.

Screenplay requires hours of hard work but the results are usually impressive. The booklet shows how the departments illustrated within the software work in a real production company. It provides an exposé of the film world. *John Gilbert*

Publisher Macmillan
Price £8.95 **Memory** 48K
★★★★

The Custard Kid

GENERAL CUSTARD, famous for his last stand against the indians left behind him a son, **The Custard Kid,** not so famous for his rather sticky end while hunting for 12 custard recipes.

At least the Kid is not yellow, he will fight to the bitter end to turn vile,



lumpy custard monsters to trembling, yet delectable mounds of jelly. For how else is he to keep up his strength? The Kid must eat.

Guide him through a vast maze of rooms and corridors, collecting colour coded keys which allow access to rooms, search treasure chests for custard detectors, more keys, bags of money and spoons.

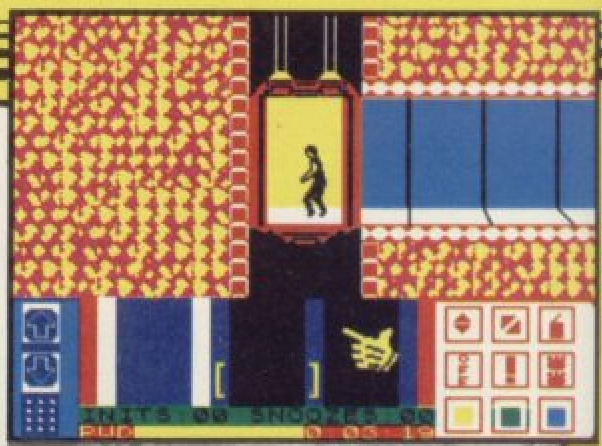
'You're nicked mate', mouths the guard while escorting you to the dungeons. Those are full of creepy crawlies and a variety of objects which block your path to the exits.

The game is probably one of the most inexpensive games to make use of icons. Once an object has been picked up it is stored in the Kid's pocket — a grid to the right of the screen. To access any of those, use the fire button to place them in the Inhand position. The system is simple to use.

The Custard Kid is similar in many respects to a large number of other games — all **Atic Atac** style — lots of rooms to explore, nasties to avoid or kill and objects to collect. However, it has a complex playing area, it is inexpensive and best of all, up to four people can play together. *Clare Edgeley*

Publisher New Generation
Price £4.95 **Memory** 48K
Joystick Kempston, Sinclair
★★★

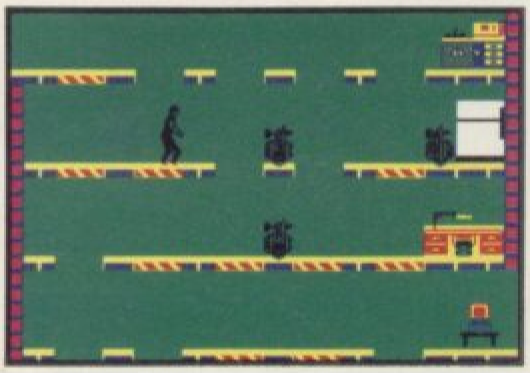
more software on page 30



Impossible Mission

COMMODE lovers thought it was great, apparently, but we weren't so sure — on the lovable old C64 you get brilliant music. That's not possible with the Spectrum.

Nevertheless, **Impossible Mission** holds up as a good game even without the frills. You play a secret agent sent to investigate the plots of mad scientist Elvin, who is holding the world to nuclear ransom. You must somersault through the levels of his hideaway, collecting pieces of the secret code.



Strategy is important. Codes are gained by searching the various objects — bookcases, terminals, safes and the like — in the complex, but getting at those objects is more difficult. It's easy enough to get most of them, but you'll have to organise your use of the lifts to dodge the robots which patrol the complex.

There are also rooms with puzzles in them. You'll have to work out what the puzzle is before you solve it.

What makes **Impossible Mission** particularly addictive is that it produces a completely new map each time you play, the rooms linked to central lift shafts are assembled in a different order for the new game. That means you can't use the same techniques over and over again to win.

Add to that the slick graphics of the sort you expect from US Gold, nice animation with the somersaulting agent, and good use of what little sound is available, and you have a fine entertainment. *Chris Bourne*

Publisher US Gold
Price £7.95 **Memory** 48K
Joystick Sinclair, cursor, Kempston
★★★★

Birthday Party/ Narrow Squeaks

TAKING CARTOON characters from the television and using them for software isn't always successful, but two games by Macmillan Software work quite well.

Both are programmed by Widgit, by now veterans in this field. **Orm and Cheep — The Birthday Party** is a younger style **Phineas Fogg**. There are no words to read and it is essentially a maze game.

Cheep has to overcome certain problems before bringing all his friends to Orm's birthday party, but first he must find his friends. Mole is



the most difficult to find.

Elementary maps can certainly help. Decisions are easily made by pressing a key when a signpost flashes.

Narrow Squeaks is a collection of four games, mainly concerned with logic puzzles. The graphics are good and I particularly liked **Rat's Game** where you have to move each of the animals out of a hollow tree trunk.

Both games appeal to the 4-7 age group and a useful addition to the family library. *Theo Wood*

Publisher Macmillan Software
Price £6.95 **Memory** 48K
★★★★



XCEL

FEW REMEMBER mankind's great achievement, a series of 30 planets constructed to protect their creators. They are called Sentinels and keep the balance of power in the galaxy.

Those planets have grown into conscious entities and have acquired a taste for power. Mankind has become too dependent on them and they must be destroyed.

Firts you must locate one on your sector map and then warp through hyperspace to go into orbit around it. The planet beneath the ship is shown in 3D at the centre of the main display. It rotates in a downward direction in relation to your ship.

Once you have arrived you can launch a shuttle which descends to the planet surface, ready to take on the alien fauna. You must shoot everything except the trees.

The alien hunt on the planet is the weakest part of the game. In the first



phase a downward scrolling movement is used to bring the aliens onto the screen. They are sitting targets.

XCEL depends heavily on graphics and not much else. The game is yet another version of **Star Trek, Space Invaders** and **Centipede** rolled into one. If you like turbo-charged graphics and hybrid plots the game will appeal to you. If, however, you are a battle-hardened hack you will find better shoot 'em ups on the market. Try **Glass** for one! *John Gilbert*

Publisher Activision
Price £7.95 **Memory** 48K
Joystick cursor, Kempston, Sinlcair
★★★

more software on page 32

THE 3D INTERSTELLAR ADVENTURE



ASTRO Clone

Those devious Seiddabs are mustering for another attack! Venture through a recently discovered series of stargates guarded by Seiddab fighters, and you'll find a system of named planetoids, each a part of the Seiddab war machine.

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There are also aliens and robots who could help or hinder your plans. Furrimal for instance, is partial to chocolate, while another needs a battery to be of any use. . .The list is endless! Your clone can pick up and store objects, turn and fire a laser – he can even throw objects across the room! Futuristic graphics plus unique sound through many different scenarios make this the ultimate space adventure movie.

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Grumpy Gumphrey

THE LIFE of a store detective is not always fun, especially when you have to pamper to the whims of a psychotic store boss who is hooked on warning notices, bring him cups of tea and look after your reputation as a super sleuth.

Play starts on the street outside the store. You must decide how to keep the boss happy for a day without getting the sack. You will be given three warning letters before that unhappy event occurs.

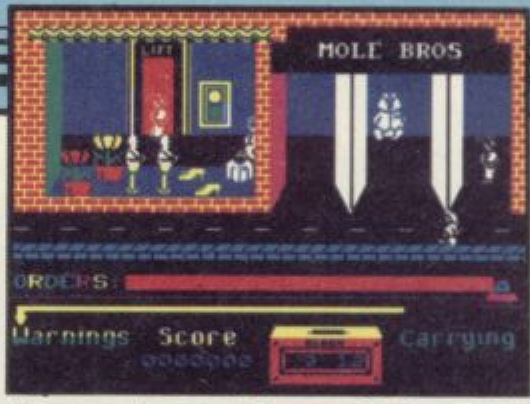
Your first job should be to map the store. Although you have been there for years you have had a sudden attack of pernicious amnesia.

Getting tea for his nibs is easier said than done. First you have to find it, crashing though hundreds of customers who are not averse to calling you a clumsy oaf. Then take the tea to the top floor where Sir — a talking head in a swivel chair — will give you a mouthful of abuse, courtesy of the scrolling message window.

On your way up you will find objects which will be of help in your store patrol. Those include a wooden box, a skateboard, a gun, a hammer and a cage. The use of some of those is obvious but you will have to work hard to discover the use of others.

As well as giving the boss his tea you are contracted to shoot ducks on the ground floor, kill bugs — not in the program — and extinguish fires. All those tasks are overseen by the boss who will literally give you the boot if you are slow. So, get on your skateboard and start moving. The day finishes at 5.30pm and there are still hours of hectic floor walking ahead of you.

Grumpy Gumphrey, Supersleuth, with its novel plot, is a welcome



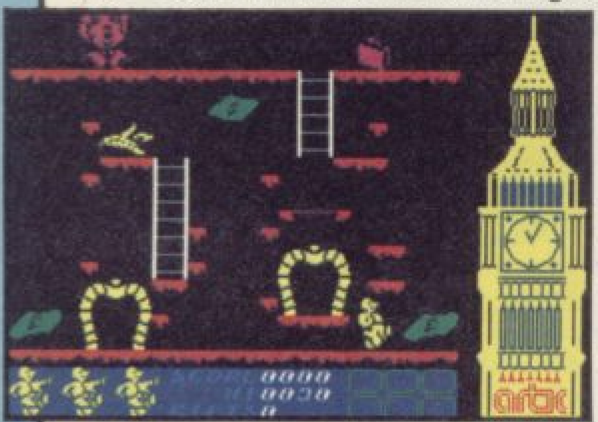
change from **Monty Mole**. The graphics are better than the Mole games — not so much screen flicker — and the plot is complex. Most of the characters within the store have some semblance of intelligence and often reveal that they have more upstairs than Grumpy.

Show your boss that you can bring some sanity to this computerised version of a Saturday morning at Marks and Sparks. You will find it a difficult but rewarding job. *John Gilbert*

Publisher Gremlin Graphics
Price £7.95 **Memory** 48K
Joystick Kempston, Sinclair
★★★★★

Big Ben Strikes Again

TOP TORY ministers were last night



revealed in a leaks-for-favours scandal which seems set to shake the very core of Mrs Thatcher's Government.

Chronical reporter Big Ben claims that while in pursuit of a major scoop he discovered senior cabinet ministers flickering through the sprite-ridden corridors of power, prepared to accept gifts in return for portions of his story.

Ben, tired and emotional after his ordeal, described the interior of the Palace of Westminster as "a crazy world of levels and ladders. Some of the rooms are extremely difficult to negotiate, others a simple matter. And there's the most awful music coming from somewhere, it drives me potty."

New revelations include allowing the public to redesign the Houses of Parliament, positioning walkways and stairs where it wants.

When asked to respond to criticism of the colour clashes involved in the new decoration scheme, the Prime Minister replied: "Of course we care about the quality of the graphics. Of course we do. But There Is No Alternative. Why don't you moaning minnies talk about the good points of the game, such as . . . (cont page 94).

Chris Bourne

Publisher Artic
Price £6.95 **Memory** 48K
Joystick Kempston, Sinclair, cursor
★★★

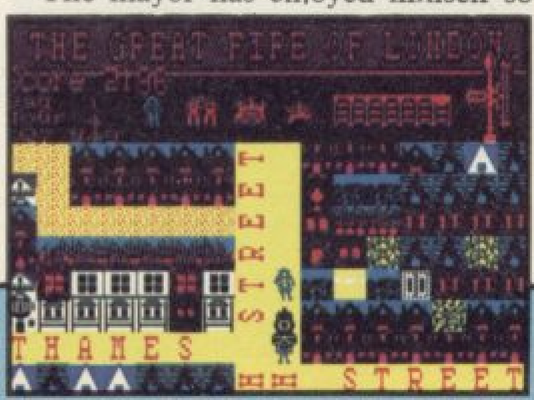
The Great Fire of London

FIRE RAZES London to the ground. As the blaze sweeps through the city, firemen, demolition workers and gunpowder gangs work round the clock to check the flames. They have four days to complete the job.

Work is hindered by the wind, which keeps veering, driving the flames even further through the city. The only hope now is to contain the fire by demolishing buildings and dousing others with water to create fire breaks.

The mayor is still on the scene, organising the work teams and guiding them to new areas of danger. The water pumps need to be refilled from the Thames and the firemen are running back and forth like yo-yos. The demolition gangs are working to rule and keep downing tools for their tea breaks – especially when the going gets tough.

The mayor has enjoyed himself so



much that when the fire of London has been put out he will start another, creating a new map with different street names and layout.

You are given two options – whether you want the wind to keep changing direction and the time it takes the fire to spread, making the game more of a challenge.

The Great Fire of London is the first offering from the newly resurrected Rabbit Software under the Virgin label. *Clare Edgeley*

Publisher Rabbit **Price** £3.99
Memory 48K **Joystick** Sinclair, Kempston, Protek
★★★

more software on page 34


LORD OF THE RINGS
GAME ONE
AT LAST! The eagerly awaited sequel to the fabulous classic "The Hobbit" is now available. "The Hobbit", classed as 'the ultimate adventure game of all time', was just a taste of what you can expect in LORD OF THE RINGS.
Astonishing vocabulary, graphics and more locations than you could imagine possible!
LORD OF THE RINGS Game 1 is available on C64, BBC, Spectrum and Amstrad at £15.95. This stunning package includes two cassettes, large booklet and a copy of "The Lord of the Rings" Part 1.
MELBOURNE HOUSE

World Series Basketball



IMAGINE'S seemingly endless trek through the backlist of Konami's coin-op games has finally reached the basketball court.

First impression of **World Series Basketball** weren't great — small featureless players chasing an equally small ball round a scrolling court. But those were instantly revised once play started — it's a hard game to beat. No matter that you have only four players, the opposing team has the same.

Play starts on the centre line when the ball is tossed into the air. The computer team must have been practising with the Harlem Globetrotters, expertly catching and passing the ball, shooting and tackling with skill. It's hard enough keeping up with them, let alone trying to take the ball away.

Basketball is played according to the rules and the game is as accurate as possible on the Spectrum. Watch out for time penalties. If you hang onto the ball for too long it will be given to the other side. Tackling is difficult, retaining the ball harder still and it takes a while to be able to judge distances and angles when passing. Half time takes place after three minutes when the teams swap ends.

The player handling the ball takes on a different colour from his team mates for recognition purposes. However, that can be confusing, especially with the attribute clash as the colour leaks onto any other players in proximity.

It is also possible to lose your player. If the opposing team takes the ball down to their end of the court, only that half of the court is shown on the screen. If you are not quick enough you will be left behind — literally out of the picture. While you are trying to locate your player the opposing team are scoring several goals. You just can't win. *Clare Edgeley*

Publisher Imagine
Price £7.95 **Memory** 48K
Joystick Kempston, Sinclair
★★★★

World Cup Soccer

SOCCER fans who fork out for this package get three things for their money. Firstly, there's a booklet about soccer and the world cup.

There are also two programs, one on each side of the cassette. The first is a database of facts about the world cup. A menu allows you to choose a country, or a particular series, and examine the fortunes of the teams.

That program also contains a quiz option with three levels of difficulty. You can play on your own or against a friend, and your score depends on



how quickly you answer the questions. The quiz is fun — easy to begin with but quite tough at the top level.

The second side is more interesting — a game called **World Cup Manager**. You must select your team from a squad of players, with percentage ratings for strength, stamina and skill. Once that's out of the way, the match starts. The first half is boring.

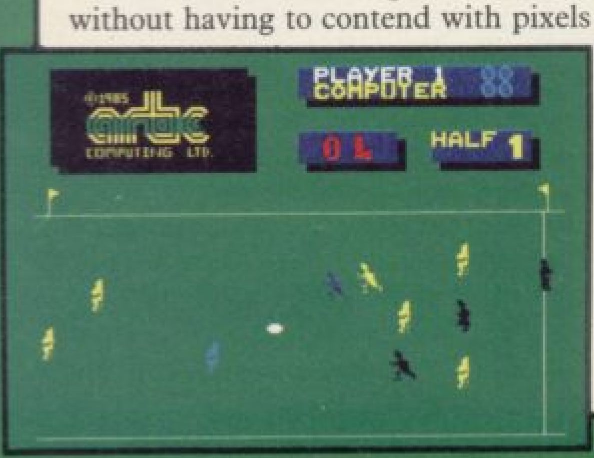
The second half of the game is played as a couple of arcade mini-games. Depending on your success in these two games, you may be awarded further goals — or concede them to the opposition.

There is simply not enough variety and challenge to make the game really exciting, and a world cup game with no excitement is a bit like **Miami Vice** with no designer jeans. *Chris Bourne*

Publisher Macmillan
Price £8.95 **Memory** 48K
Joystick Kempston, Sinclair
★★★

International Rugby

RUGBY, or Ruggah as it is known on the muddy fields of England, is not the ideal sport to simulate on a computer. It's confused enough in real life, without having to contend with pixels



and attribute clashes.

International Rugby allows you to play a friend or the computer in the Five Nations series, of which the Triple Crown forms a part.

Unfortunately, the players flicker continuously, the controls are sluggish and it's difficult to maintain the flow when the player being controlled changes all the time — you always seem to be running away from the ball. Although Rugby is very much a team game, requiring the setting up of elaborate passing movements to outflank opposition, Artic's version demands the reverse — if you get the ball, your best chance of scoring is to run for the line, dodging as much as you can.

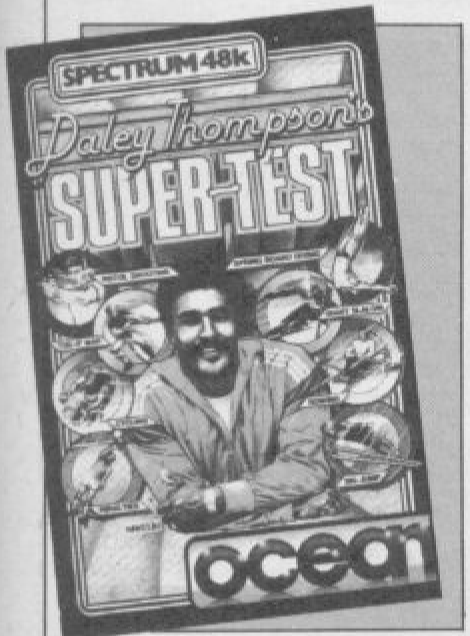
Passing appears most erratic, although hours of practice may improve what precision the program provides. But you're unlikely to want to stay with it that long; the flickering figures are a strain on the eyes, the players themselves seem to be wearing long kilts, and often just stand still with the ball waiting to be tackled — or so it seems.

There may be a few boneheaded enthusiasts out there who'll want the only rugby simulation in town, but we fear sales are likely to be as limited as the appeal of this poorly designed offering. *Chris Bourne*

Publisher Artic
Price £7.95 **Memory** 48K
Joystick Kempston, Sinclair
★★

Gallup TOP 30

MONTH ENDING OCT 12



1	◆	DALEY THOMPSON'S SUPERTEST	OCEAN
2	◇	WAY OF THE EXPLODING FIST	MELBOURNE HOUSE
3	◆	FAIRLIGHT	THE EDGE
4	◆	FIGHTING WARRIOR	MELBOURNE HOUSE
5	◇	FRANK BRUNO'S BOXING	ELITE
6		NOW GAMES	VARIOUS/VIRGIN
7	◆	BORED OF THE RINGS	SILVERSOFT
8	◇	NIGHTSHADE	ULTIMATE
9	◆	ACTION BIKER	MASTERTRONIC
10	◆	G. GOOCH'S TEST CRICKET	AUDIOGENIC
11	◇	HYPERSPORTS	IMAGINE
12	◆	MARSPORT	GARGOYLE GAMES
13	◆	SORDERON'S SHADOW	BEYOND
14	◇	HIGHWAY ENCOUNTER	VORTEX
15	◆	FINDERS KEEPERS	MASTERTRONIC
16	◆	HACKER	ACTIVISION
17	◇	SOFT AID	VARIOUS
18	◆	POPEYE	DK TRONICS
19	◇	DYNAMITE DAN	MIRRORSOFT
20	◇	JET SET WILLY 2	SOFTWARE PROJECTS
21	◇	SPY VS SPY	BEYOND
22	◇	DAMBUSTERS	US GOLD
23	◆	EMPIRE FIGHTS BACK	MASTERTRONIC
24	◆	SHADOW OF THE UNICORN	MIKRO-GEN
25	◇	FRANKIE GOES TO HOLLYWOOD	OCEAN
26	◇	SPYHUNTER	US GOLD
27	◇	NONTERRAQUEOUS	MASTERTRONIC
28	◆	FORMULA 1 SIMULATOR	MASTERTRONIC
29	◆	BMX RACERS	MASTERTRONIC
30	◇	NICK FALDO'S OPEN	ARGUS

BUBBLING UNDER

IMPOSSIBLE MISSION	US GOLD
STARQUAKE	BUBBLEBUS
CRITICAL MASS	DURELL
TERRORMOLINOS	MELBOURNE HOUSE
ROBIN OF SHERWOOD	ADVENTURE INTERNATIONAL
RUPERT & TOYMAKER'S PARTY	ARGUS
WORLD SERIES BASKETBALL	IMAGINE
THE RATS	HODDER & STOUGHTON
JASON'S GEM	MASTERTRONIC
ABU SIMBEL PROFANATION	GREMLIN GRAPHICS

THINGS SEEM to be hotting up for the winter with new releases entering the charts like there's no tomorrow.

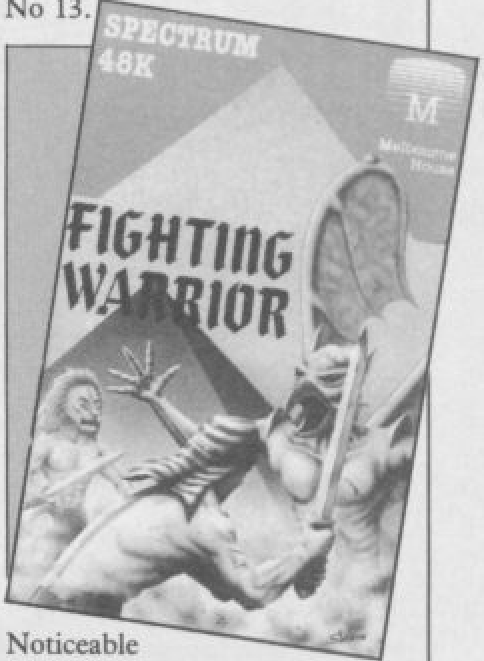
The highest new entry is **Fairlight**, going straight to No 3 within weeks of the launch, despite a few problems with bugged copies, now resolved.

Melbourne House is only one place behind with **Fighting Warrior**, which looks set to repeat the success of the all-conquering Exploding Fist. With **Terrormolinos** creeping up fast, the Aussies are well on their way to establishing themselves as the premier UK software house. In September Melbourne sales gave the company 20 per cent of the total sales of Spectrum Top 50 software.

Second only to Melbourne House is Ocean — 16 per cent of sales in the same period — whose **Daley Thompson's Supertest** holds the top position, though **Frankie Goes to Hollywood** is already on its way out. Stablemate US Gold is losing its grip too, taking only six per cent of the Top 50 sales in September, and with both **Spy Hunter** and **Dam Busters** slipping fast.

Whatever happened to Ultimate? Apparently the games playing public has given Sabre Man the cold shoulder, and **Knight Lore** lookalike **Nightshade** failed to reach No 1 and could be out of the top ten by next month. Neither does Software Projects appear to be flavour of the month.

Cult adventurers Delta 4 have at last hit the big time, with **Bored of the Rings**, on the Silversoft label, achieving sales previously undreamed of. Mikro-Gen's innovative **Shadow of the Unicorn** is doing well, too, and Beyond's **Sorderon's Shadow** has entered at No 13.



Noticeable by its absence is **Monty on the Run**, though publisher Gremlin Graphics has **Abu Simbel — Profanation** bubbling under. Other games to look out for include **Elite** and **Chimera** from Firebird, **Astro Clone** from Hewson Consultants and **The Secret Diary of Adrian Mole** from Mosaic.

Ten of the games in the Top 30 are *Sinclair User* Classics, as are two of the bubblers, which goes to show that we do get it right some of the time.

Finally, what about Mastertronic? The company has six — nearly seven — hits in the charts, some of which are actually quite good. Budget software rules, OK?



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QL C Development Kit

THE LAUNCH of the **QL C Development Kit** was a quiet affair, but it is likely to have a profound effect on the software market. The package is aimed at the professional programmer as well as the hobbyist.

It is the first full Kernighan and Richie implementation for the QL and produces true, relocatable, machine code. The package consists of a lengthy manual, three microdrive cartridges and a ROM.

The first cartridge contains the run-time editor and the Sinclair standard linker. The full screen editor will take any ASCII input and is standard to all the Metacomco products. The linker is used to chain together modules of compiled code.

Compilation is a two phase operation, although the passage between the phases is easily accomplished. Each phase is on a separate microdrive.

Phase one is invoked using the SuperBasic procedure name LC1. It reads in the source you have produced using the screen editor, and creates an intermediate compilation which is stored on microdrive or disc using the same file name as the source.

Different types of file are distinguished by using file name extensions in a similar way to those used by the Psion business suite. For instance, the source code is labelled, _C; first phase compilation, _Q; and final phase, _O. In that way the computer knows the type of file it is dealing with.

The command format for phase one includes a number of optional specifiers. Those will change the number of bytes used by the execution stack — from a default value of 2048 — and allow the entry of compile time options. The basic load command consists of the instruction followed by drive specifiers. For instance:

LC1 "mdvl_ flp2_sinclair"

would load the first phase code from microdrive one, load your source from disc drive two, produce an intermediate compilation and save the file.



The second phase of compilation reads in the file created by the first, and produces object code in the Sinclair standard format. That object file must then be turned into an executable job using the linker.

In comparison with the GST compiler, reviewed in August, the Metacomco Development Kit is far superior in performance and standard. It is a full Lattice implementation, whereas GST is manufacturing a version of RATC. That is in the public domain — anyone can use it — and is to C what mini-LOGO is to LCSI LOGO.

The compilation process is slightly easier with the Metacomco package. GST QC changes the source into assembly language and converts that into machine code. While both packages use a similar process the QC components are run separately. Compilation can be automated with the Metacomco package by using the QLC command which loads in phase one and then phase two.

The library routines, which make up the bulk of most C packages, highlight the differences between the Metacomco and GST packages. Metacomco has produced a version of the language which is portable — meaning that the source you write can be used on other machines. For that reason the library functions which can be linked into your programs do not deal with QL screen or sound. They include routines to deal with memory allocation, mathematics and files.

The GST package is tailored to the QL. It too has a standard input/output library, but it contains routines to interface with QDOS and produces window and graphics effects. For that reason, and because of the low price, it was recommended for C beginners.

Metacomco's package will provide the standard for system development. It will be used by professionals and those who are already expert in the use of C. *John Gilbert*

Publisher Metacomco
Price £99.95
★★★★★

Crazy Painter

YOU ARE invited, brush in hand, to give this old game a new lick of paint.

No prizes for guessing what you have to do, but I'll explain for those who have been in the wilderness for the past three years. Use the brush to paint the screen while being plagued by dogs, space invaders, bursting bubbles, snakes and a man who is intent on stopping your work.

You can drive some of the crudely animated sprites off by colliding with them but others, such as the snake and paint snatcher, will strip you of your tools.

Once you have plastered the whole screen with paint you must stop it dripping. If you are persistent, and lucky, you will move on to another colour paint and earn a bonus. Remember, you must keep the paint gleaming until your pot luck runs out.



Although the sprite graphics are not satisfactory and the game repetitive you may find it addictive – I didn't. If you are still willing to pay nearly £13.00 for a game, **Crazy Painter** should keep you happy for at least three minutes. If, however, the standard of games software throws you into a fit of manic depression then don't buy it, you'll have another attack. *John Gilbert*

Publisher Microdeal **Price** £12.99
Joystick
★★

more QL software on page 44


HANTAREX
Opus.

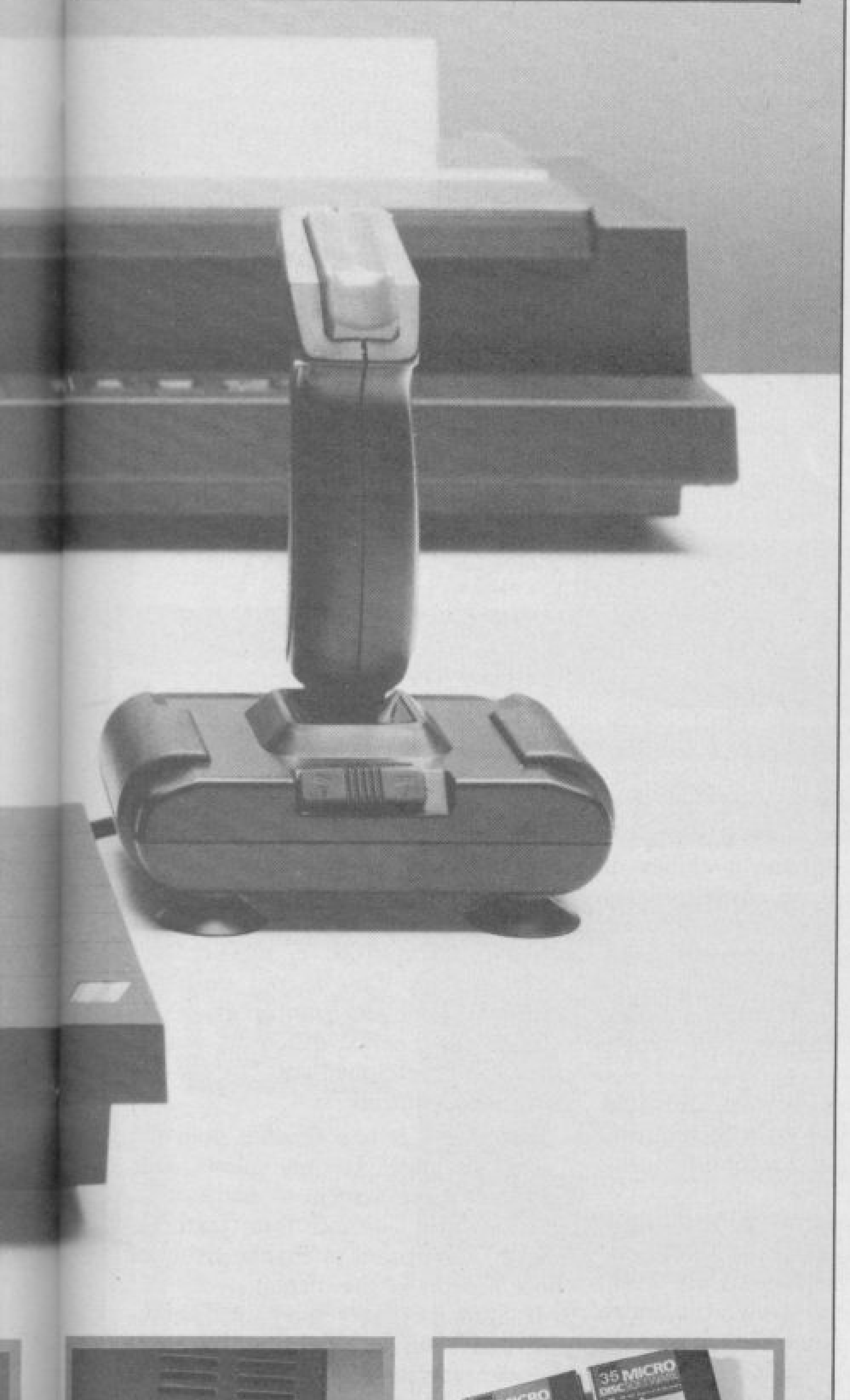

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Cosmos

STARRY-EYED astronomers will immediately fall for **Cosmos**, from Talent.

The package contains everything you will need to keep track of the constellations, whether you keep an observatory at the bottom of the garden or a pair of binoculars in the study.

The main menu allows you to set up a star map for a particular position, time and date. Any time or date can be used and position is specified by longitude and latitude.

Once the map data has been fed in you can select your viewpoint. For instance, you can look towards any compass point or get **Cosmos** to plot a map of the whole night sky.

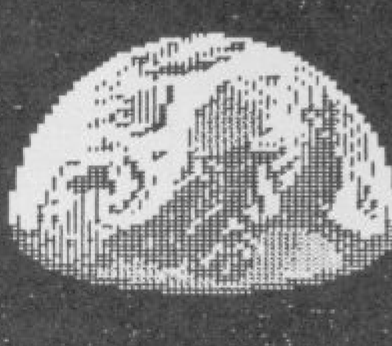
When the view you require has been plotted you can take an even closer look at the stars and planets. The quickest way to do that is to call up the Direct Select option. A list of planets is displayed together with an option to take a closer look at the stars.

If you select the Moon – OK, I know it's really a satellite – a data sheet will appear on the screen showing its location, size and distance in light years from earth.

Cosmos will also show you what some of the planets look like to the naked eye if viewed at a selected time of the year. The display is educational, especially as far as the moon, Mercury and Venus are concerned. You could not get that sort of detail in a book.

The star data option on the menu gives you information about any star you care to mention. Just type in its magnitude and **Cosmos** will provide all the other data including type, position, luminosity and colour.

You can call up star data using a circular cursor. Position it over the star of your choice and press ENTER. If no star exists at that point the cursor will jump to the nearest star location and display its data.

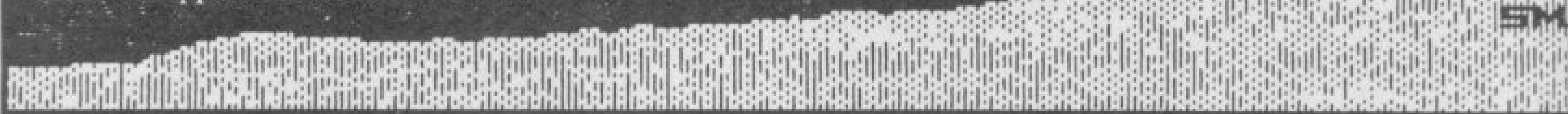


Cosmos will also help those who are following Halley's Comet. Talent has incorporated the comet into the display. If you want to locate it between November 1985 and May 1986, at any time or place on Earth, then just ask **Cosmos**. Unfortunately, it will not plot its position for the last sighting period or the next one but it is unlikely that anyone would be around when the comet next appears.

Although the program is in Basic the enormous amount of data is handled with near machine code speed. The speed at which star charts are constructed is also very respectable.

Cosmos is one of the best astronomical packages on the market. The mass of information, simplicity of use, and graphics make it ideal for professional and amateur astronomers. It almost tempts me to go out and buy a telescope. *John Gilbert*

Publisher Talent **Price** £14.95
Joystick
★★★★★



Sketchpad

SOFTWARE manufacturers must think that all QL owners want to do is draw pictures judging by the number of design packages on the market.

Sketchpad has been around for nearly a year but Sigma has finally released a significantly improved version, 2.00, which works to specfication. It has been converted from SuperBasic into BCPL and machine code. The increase in speed is noticable, particularly when you are drawing, and the presentation is of a higher standard than the previous version.

The facilities are almost identical to those in **GraphiQL**, from Talent, but the layout is different. There are three windows on the screen. The first provides status information such as file name, bytes used for the drawing and the X,Y co-ordinates for the pen cursor.

The second window displays one of the three menus, giving a choice of drawing methods, an overlay grid option, and two types of fill. Finally, the third window is the drawing pad. **Sketchpad** optimises storage by only storing the objects you draw in RAM, it does not make a copy of the whole screen.

Option selection is easy. Just use the function keys to call the required menu and highlight the option using the cursor keys.

The easiest drawing option to use is the elastic line command. Press the space bar to set the point of the origin and use the cursor to stretch the line to the desired destination.

Other shapes, such as circles, ellipses, rectangles and triangles have their own options. The ellipse command is the most interesting to use. Use the cursor to draw a line then press the space bar and it turns into an ellipse.

The cursor can then be moved to increase or decrease the curvature of the shape. Complex helix patterns can be drawn in a matter of minutes with only a few key presses.

The one advantage that **Sketchpad** has over **GraphiQL** is that text of differing sizes can be put onto the screen and moved around using the cursor. Text and different shaped objects can be cloned and cut out of a picture if required.

Sketchpad is less flexible than the Talent package. It only allows four colours on the screen — black, red, green, white — and four textures. There is no option to change either of those aspects of the display.

If Sigma's first version of **Sketchpad** had been as good as **GraphiQL** the company would be at the leading edge of QL software. Unfortunately, it made a mess of the product and version 2.00 is a desperate attempt to save face. *John Gilbert*

Publisher Sigma Research
Price £14.90
Joystick
★★★

BETA BASIC 3.0

SINCLAIR USER, JAN. 85 (ABOUT RELEASE 1.8): "HAS ESTABLISHED ITSELF AS THE STANDARD EXTENDED BASIC FOR THE SPECTRUM......TURNS SINCLAIR BASIC FROM A GOOD VERSION OF THE LANGUAGE TO A FANTASTIC ONE..." NOW, WITH RELEASE 3.0, BETA BASIC BECOMES PROBABLY THE MOST POWERFUL BASIC AVAILABLE ON ANY 8-BIT MICRO!

- PROCEDURES - a very full implementation that lets you extend Basic easily. With parameter passing by value or by reference (including arrays), LOCAL variables, recursion, DEFAULT parameter values, and the ability to handle parameter LISTS of any length. No PROC keyword is needed; e.g. you can use things like: swop a,b or draw_box 10,20,5 or addup b(),sum.
- GRAPHICS - up to 128 WINDOWS, each with its own character size (giving 1-64 chars/line!) and attributes. ROLL and SCROLL any part of the screen by any number of pixels in any direction! Use GET to store parts of the screen, then put them back anywhere at different magnifications. Fast FILL, ALTER attributes, PLOT strings, DRAW TO a point, change scale and origin.
- TOOLKIT features: Renumber with block move or copy; block DELETE, search and/or change (e.g. ALTER applies TO a). 36 User-defined keys. List the variables, list a procedure, list DEF KEYs.
- EDITOR - lets you move the cursor around the screen 10 times faster! And you can move the cursor up and down within edited lines. AUTO, EDIT, JOIN and SPLIT commands.
- LISTINGS with optional automatic indentation of loops, IF, procedures etc. Works on existing programs e.g. you can choose to list:

```
10 FOR n=1 TO 10: PRINT n: NEXT n
```

as:

```
10 FOR n=1 TO 10
     PRINT n
   NEXT n
```

- KEYWORDS can all be entered by typing them in full, or by the "single entry" method, or <u>both</u> in the same line; e.g. the line: 10print"hello":if x=1 THEN goto 100 will be recognised and listed normally.
- Upgrades to Release 1.8 customers: If you bought direct from us, there is no need to return your cassette - just quote the (approximate) original purchase date with your order; otherwise return your cassette and name your supplier. The upgrade price of £6.95 (£7.50 overseas) includes a new manual.
- ARRAY and string handling features include fast INSTRING (100,000 chars/sec) and INARRAY search functions. You can JOIN arrays together, delete, transfer and insert sections, change dimensions without data loss. LENGTH function gives dimensions. Ultra-fast array SORT - e.g. a$(500,30) will sort in about 3 seconds!
- MICRODRIVE commands let you use simple forms, or exactly the same commands you normally use for tape - just enter DEFAULT =m1 or m2. Some possible Microdrive commands: SAVE "name", ERASE "name", LOAD 1, "name", SAVE 10 TO 100; "part prog". SAVE a "slicer" or just the variables. MOVE programs, CODE, arrays. MERGE auto-running programs. End-Of- File function.
- OTHER FEATURES, new or improved, are too many to describe: DO - LOOP structure with WHILE, UNTIL and EXIT IF; BREAK, CLEAR, CLOCK, CONTROL CODES, EDIT variables, ELSE, GET, KEYIN (programs can write themselves!) multi-LET, (L)LIST a "slicer", ON (works with line nos, procs, etc.) ON ERROR, OVER 2, POKE strings, POP, READ LINE, TRACE, USING, DPOKE. Faster GOTOs, GOSUBs and FOR-NEXT loops.
- 26 FUNCTIONS: AND, OR, XOR, DEC, HEX$, BIN$; fast SINE, COSE, RNDM; CHAR$, NUMBER, DPEEK, EOF, FILLED, INARRAY, INSTRING, ITEM LENGTH, MEMORY$, MEM, MOD, SCRN$, SHIFT$, STRING$, TIME$, USING$.
- Spectrum Basic compatible - you can run existing programs. Transferable to Microdrive. Syntax check on entry. Extra error messages. Compatible with most printer interfaces (please specify). Wafadrive version available.
- Comprehensive A5-size manual. More than 80 pages, with many examples.
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- Release 1.8 remains available, at a lower price of £8.95 (£9.50 overseas). You can upgrade later to Release 3.0 for £6.95 (£7.50 overseas).
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[ ] MORE INFORMATION ON ________. I HAVE/DO NOT HAVE RELEASE 1.8 ALREADY.
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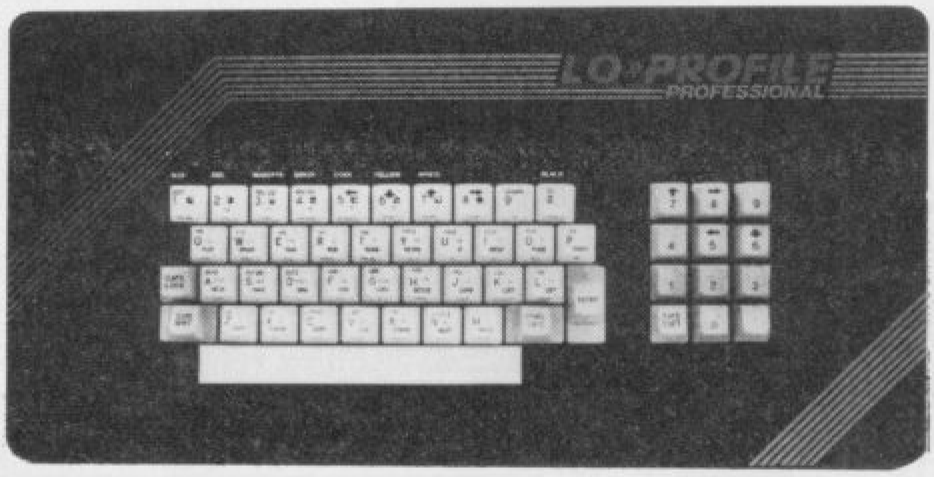
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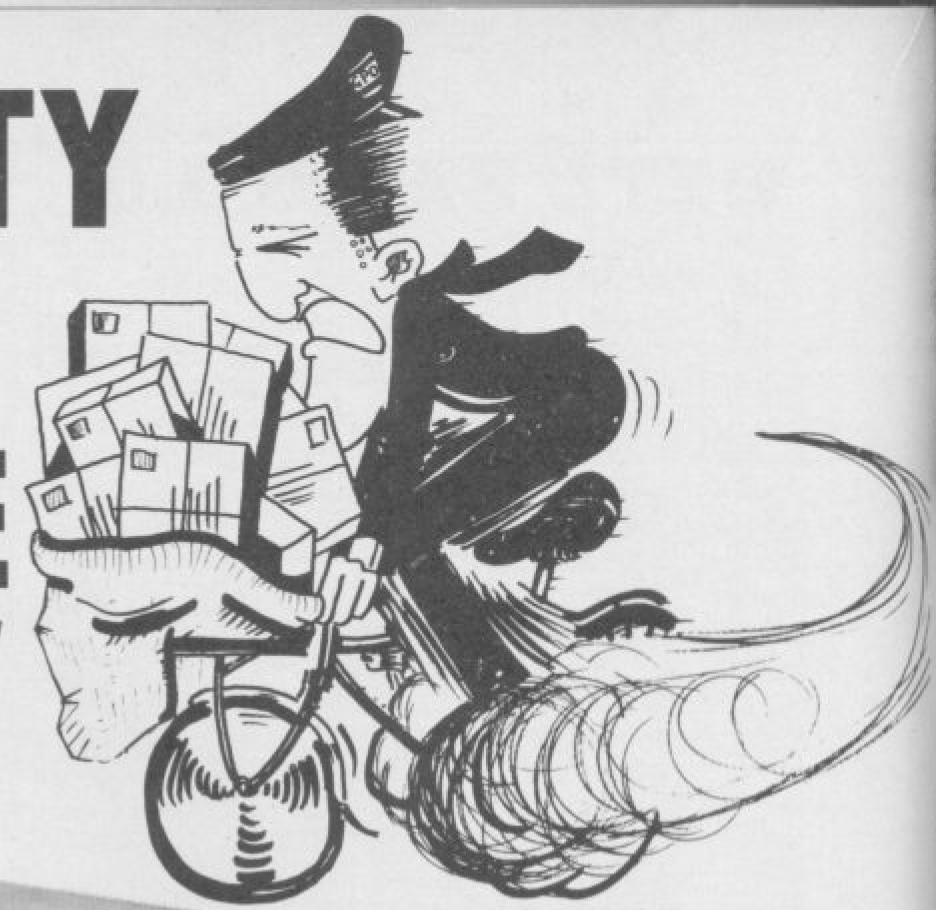
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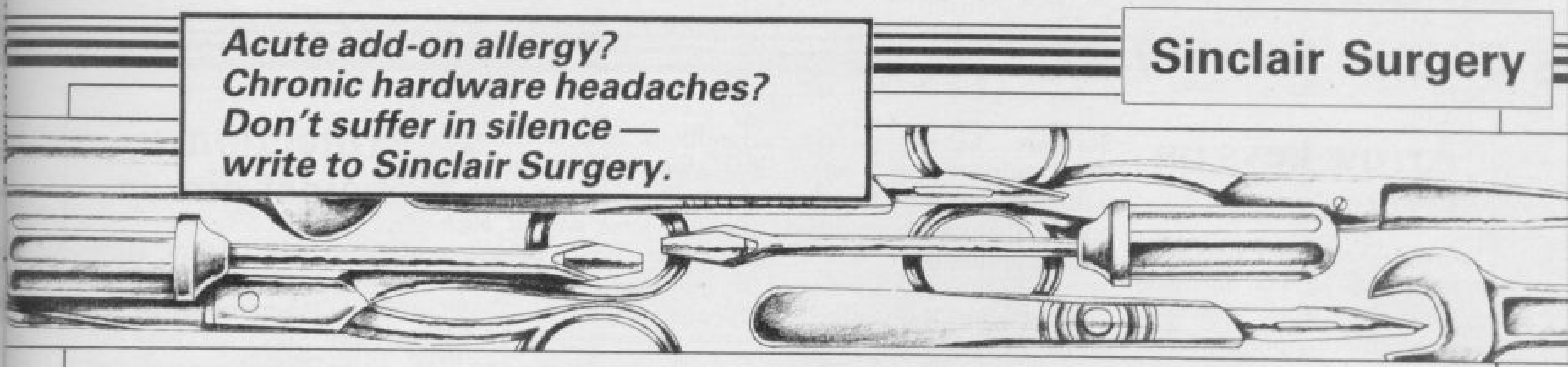
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Problems with printers

IS IT POSSIBLE to interface the Canon PW1080A printer to the Spectrum? I would also like to know the price of this printer as I have been quoted between £250 and £315. Finally, what does NLQ stand for?

**Steven Dixon,
Heckmondwike,
West Yorkshire**

● *The Canon PW1080A is an excellent printer and easily connected to a Spectrum using a Centronics type interface. The difference in price you have been quoted is due to a recommended high retail price and low discount price.*

Near Letter Quality — NLQ — means that a dot matrix printer is capable of quite good quality printing. It does that by making small adjustments to the line feed, so the dots merge together. It is a largely overrated feature, enlarged/condensed gives almost the same effect but only at 68 characters per line on an 80 column printer. It is, however, useful to be able to use NLQ on all type styles.

IS IT POSSIBLE to connect a 48K Spectrum Plus to a Brother EP44 printer, and if so what equipment is needed?

**J D Mallinson, Birstall,
Leicestershire**

● *Using Interface 1, the connections are:*

Spectrum	*EP44*
2 Tx	*2*
3 Rx	*3*
4 DTR	*20*
5 CTS	*5*
7 Ground	*7*

All other pins should be left disconnected. Set the Brother to Baud Rate 1200; Bit Length 8; Parity off (N).

MY FATHER recently purchased an EP44 printer, but we have one problem. We would like the program below changed in such a way that it will Beep after 60 CHR$ and auto-return after 64 CHR$.

```
10 FORMAT "t";1200
20 OPEN #4;"t"
25 LIST #4
30 INPUT a$
40 IF a$="fin" OR
   a$="FIN" THEN
   GO TO 80
45 PRINT #4;a$
50 GO TO 30
80 CLOSE #4
90 STOP
```

**Walter and Vanessa
Wrigge,
Dubai,
United Arab Emirates**

● *The simplest way to write something on screen is to use a word processing package, such as* **Tasword 2** *or* **The Writer**. *The following program, however, should prove useful.*

```
10 FORMAT "t";1200
20 OPEN #4;"t"
30 LET c=0
40 LET a$=INKEY$:
   if a$="" THEN GO
   TO 40
50 IF INKEY$<>""
   THEN GO TO 50
60 LET c=c+1: PRINT
   #4;a$;
70 IF c=60 THEN
   BEEP .05,1
80 IF c=64 THEN
   PRINT #4;CHR$ 13:
   LET c=0
90 GO TO 40
```

I HAVE recently purchased a Mirage Microdriver which works quite satisfactorily. However, some programs like **The Hobbit** and **Jet Pac** will crash upon loading when the Microdriver is attached, unless I disconnect my Timex 2040 printer. An Interface 2 causes no problems. Mirage claims that the Microdriver should work with both Interface 2 and ZX printer connected. Is there a difference between those two printers?

**J P van Suchtelen,
Holland**

● *There are, electrically, some differences between the Timex 2040 printer and the ZX printer, the same applies to the Alphacom 32. The only thing to do is disconnect it when using the Microdriver.*

Trouble with hardware link

I READ a report in the September issue which said the Triton Quick Disc has only a limited user port for additional hardware.

Can the Quick Disc be plugged into the through-port of the Interface 1? If not, is there any way round the problem? It seems to be a fairly serious shortcoming if a fast storage device cannot be linked to a computer alongside a printer.

Will an Opus Discovery disc drive plug into the Interface 1?

**Steve Appleton,
Leeds**

● *The Triton Quick Disc is not compatible with Interface 1, nor is the Opus Discovery. The only disc interface I know of which is compatible is the Technology Research Beta.*

Dirty drive plays up

I AM disappointed with Sinclair's microdrive system which I use in my job and also for games and software.

I have 25 microdrive cartridges, 13 of which will not load. Even when the cartridge is in the microdrive, I get the message 'microdrive not present', and **Tasword** will not print out any mail if the letters are longer than one page.

I cannot trust the microdrive system any longer and am thinking of buying the Opus Discovery. Have you any advice as to what is wrong with my microdrive?

**J P Desmares,
Belgium**

● *A common cause of this message is a dirty edge connector. Try cleaning it with an india rubber.*

As the microdrive is less than a year old if that does not work you should get it replaced under warranty.

Should you decide to get the Opus Discovery 1, you will find that **Tasmerge** *runs on it without alteration.*

Pile-up the peripherals

I HAVE a query concerning my Spectrum. Is there a limit to the number of peripherals that can be connected to the edge connector?

At present I have a Comcon joystick interface, a Slo-mo game speed controller and an Alphacom printer interface.

**C J Biddle, Oadby,
Leicestershire**

The Spectrum has a limited amount of power to spare and it can only drive the data lines reliably for about six inches.

Microdrives, wafadrives and ZX printers take a fair amount of power while simple joystick interfaces take less. Generally, you should not plug in more than three interfaces.

more surgery on page 48

Arrow keys on strike

CAN YOU help me? The four arrow keys on my Spectrum Plus work very well when entering programs but not when playing games.

Is that an inherent fault? I cannot understand why they should work whilst programming only.

F Wade-Cooper,
Burgess Hill, Sussex

● *The arrow keys on a Spectrum Plus are SHIFTED keys, for instance, Caps Shift and 5. Some commercial games do not allow for that but you should find that using keys 5 to 8 will work.*

Beeping to the sound of music

AS A RECENT newcomer to the Spectrum, I am interested in the number of music/composer programs available.

In the August issue, the Software Directory indicated only one such program, and that was not rated highly. Can you recommend a good program?

S Anderson,
Luton, Bedfordshire

● *The best music program for the Spectrum is* ***Music Typewriter*** *from Romantic Robot. Bearing in mind the limit of the Spectrum Beep, it gives reasonable sound and on-screen music notation.*

Reading up on programming

I AM AN OAP and have recently been given a Spectrum. As I have done no programming, I am going to night school to learn. Are there any books I can read to tell me about various terms — interface, wafer, RAM, ROM, bit and byte and so on?

Geo Dobson,
Saltburn-by-the-Sea,
Cleveland

● The Personal Computer Handbook *by Tim Hartnell, published by Virgin, contains the information you need. It also has some general background information on computers plus some fairly simple program listings.*

Sluggish keys are cured

MY SPECTRUM 48K is about two years old. Recently the keyboard has been slow to respond and some keys have to be pressed several times before registering.

I will soon be fitting a DK 'tronics keyboard and I am wondering if that will remedy my problem, or must I have my Spectrum repaired first?

N D Greenall
Burnage, Manchester

● *Fitting a full size keyboard will, in most cases, cure any problems you are experiencing with the old rubber one. If not, you can still get it repaired.*

Protection against piracy

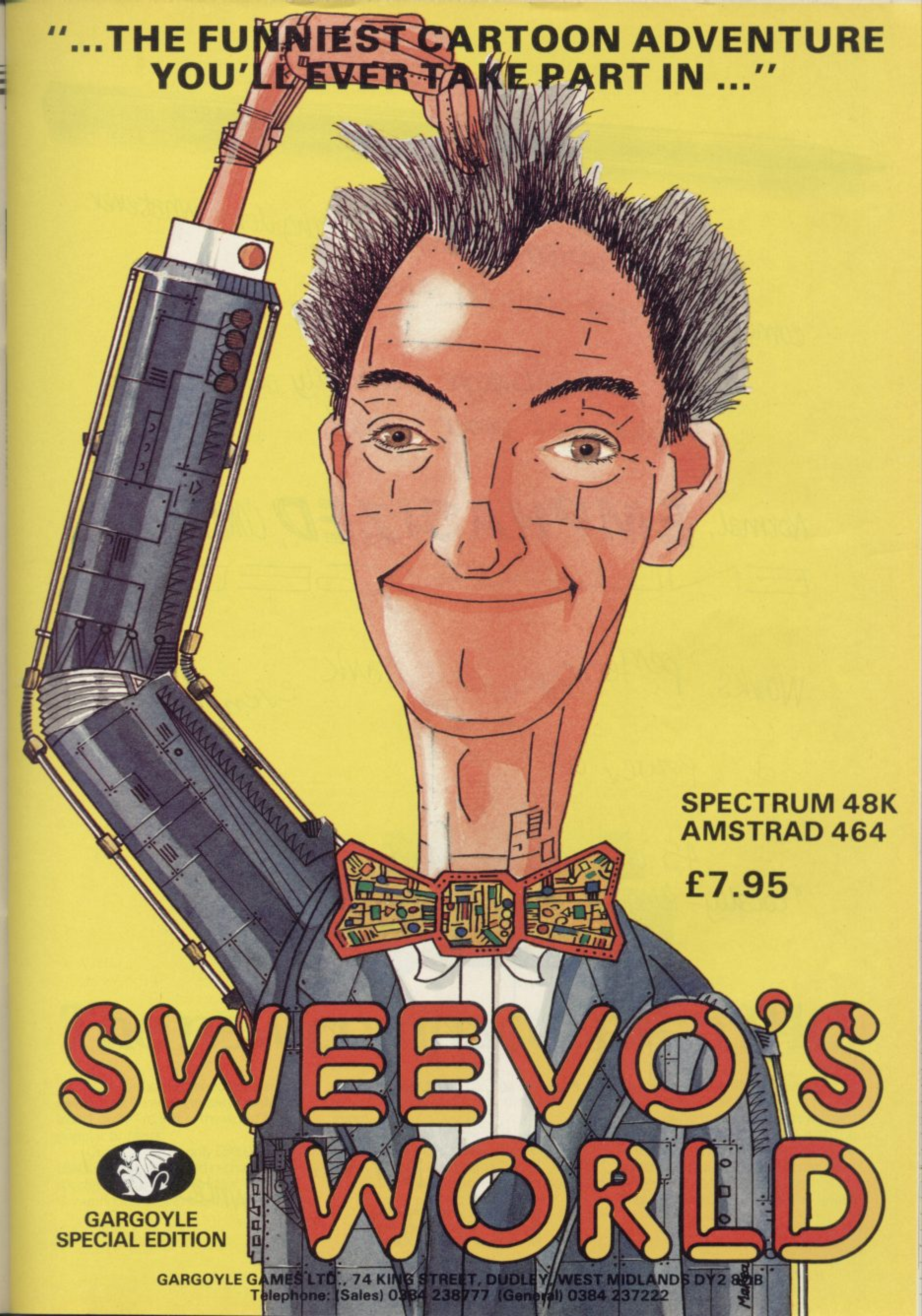
I WOULD like to know how to stop people breaking into a program written on my 48K Spectrum. How can you hide the listing so that nobody can read it?

Stephen John Duffy,
Swansea,
West Glamorgan

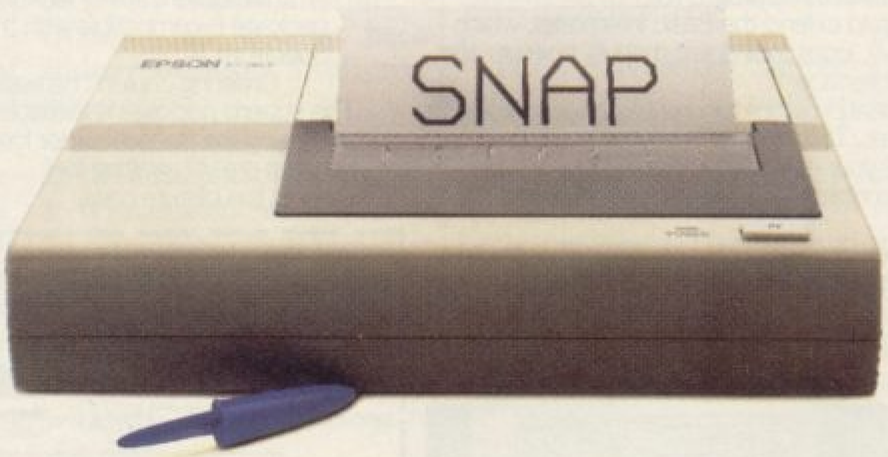
● *It is impossible to protect a program against a determined hacker. The simplest thing is to save a Basic program as code:*

```
10 SAVE "game" CODE
   16384,49152
20 rest of program
```

When that is loaded back it will auto run from line 20. Other than that, you can POKE things into lines before SAVEing and POKE them back once the program has loaded. POKEing the first byte of the two that hold the line length with 255 will prevent the program from being merged.



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AMX ART

This computer aided, drawing program has to be seen to be believed. Making full use of on-screen windows, icons, pull-down menus and pointers, you'll be astonished at the quality of the work you can produce, save and print using either ZX or Epson compatible printers. It's a program ideal for both hours of family fun or for serious professional applications.

AMX COLOUR PALETTE

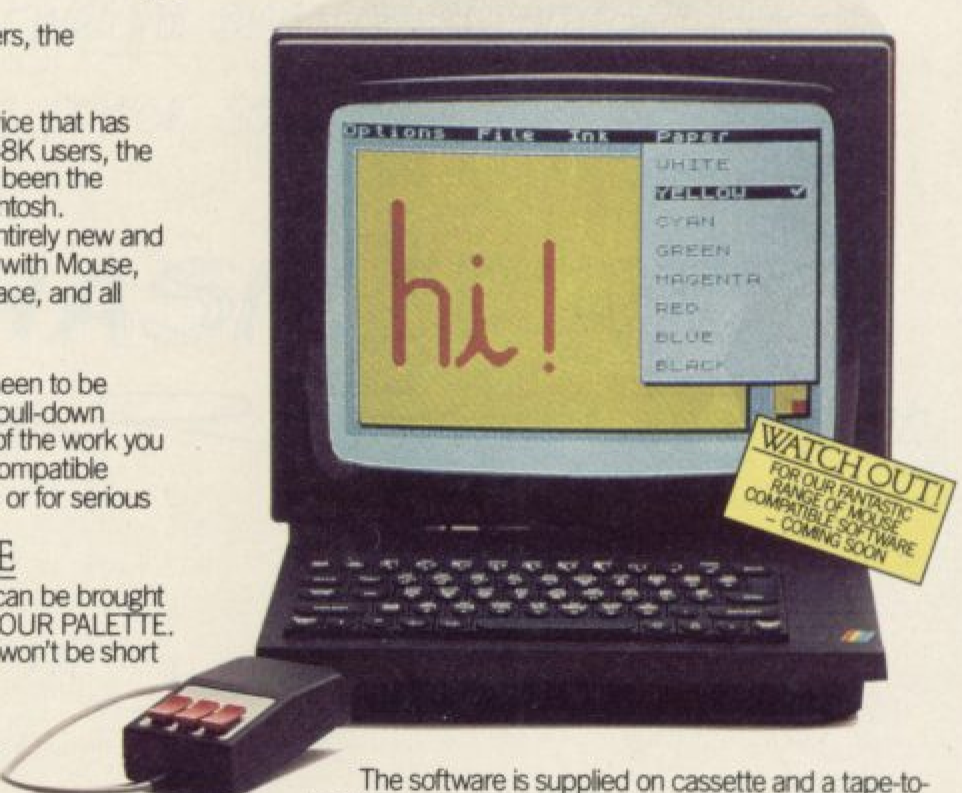
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The Winchester Protocol

A FEW YEARS ago, computers like the ZX81 were considered to be viable business machines. These days the QL is overshadowed by the likes of the Atari ST and Commodore Amiga. CST now has four new products which more than redress the balance.

If 128K of memory is not enough, CST now offers an internal upgrade to 512K. For those who find even floppy discs slow and lacking in capacity, its new Winchester hard disc is available in sizes from 10Mb upwards and, according to CST, offers speeds of up to 90 per cent of a RAM disc. Scientific users are catered for with its IEEE interface – the Q-488 – which conforms to the industry standard. Finally, the Q+4 allows you to connect four interfaces into the QL at the same time, and corrects one of the QL bugs into the bargain.

The memory upgrade requires you to send your QL off to CST where they replace the old 64K chips with 256K ones, and a handful of support chips. That, of course, will invalidate your Sinclair warranty but, unlike other similar offers, CST will honour any time left on it. In addition, the upgrade is covered for 90 days.

The obvious advantage when increasing the memory in this way is that the user port on the end of the machine is left free for disc interfaces and the like. It is also the cheapest way, but bear in mind that you now have a 512K machine, whereas adding 512K externally would give 512K plus the 128K already in the machine – 640K in total.

The price of the upgrade is £150 plus VAT which represents good value for money. It is also far more convenient than having half a ton of hardware hanging out from the side of the QL.

The Winchester hard disc is definitely the ultimate mass storage device for a computer – laser discs excepted if and when they finally appear. The unit I was shown had a 10Mb capacity, but CST can supply larger units – anything up to 100Mb.

The drive operates in a similar manner to a floppy disc, on average, about five times faster. In practice, that varies from two to ten times faster depending on the operation being carried out. The transfer rate is roughly 25K bytes per second.

Using the drive is no more difficult than using micro drives. All the usual commands can be transferred to it and run without alteration. With so much storage available the directory can end up reading like *War and Peace*, so all the commands in CST's floppy interface – October '85 – have been added, including a selective directory.

In order to keep track of all the files you could put on a Winchester, each one is date-stamped every time it is accessed. CST provides a program, called **Data Management Utility**, which allows you to deal selectively with the files according to the date.

Winchesters tend to be expensive and the CST drives are no exception. The 10Mb unit is a hefty £1,200 plus VAT which compares favourably with Winchesters for other computers. Larger units command larger prices.

The Q-488 conforms to the IEEE-488 standard for connecting peripherals to a computer. Up to 14 peripherals can be connected at any one time and, sockets permitting, you can connect more than one Q-488. The sort of peripherals you can add range from laboratory and medical instruments to printers, disc drives and modems.

The beauty of the Q-488 is its ease of use. Many other interfaces require you to delve into the operating system to work them, but CST has added a number of SuperBasic extensions which make it very simple. The Q-488 is one of the best reasons for buying a QL. More technical information can be obtained from CST, as can the interface at £195 plus VAT.

Last of CST's new products is the Q+4. That is a metal box which sits under the QL and angles the keyboard towards you. It provides four outlets to plug in interfaces or RAM at the back, and it is supplied with its own QL style power supply. It is connected to the QL via a short flexible cable to the user port, so you gain only three extra sockets.

That is its largest drawback. Although it has a ROM built in which corrects a QDOS bug, so that it can recognise more than one peripheral, and is very well engineered, the price at £170 plus VAT is rather high for what is effectively not very much.

CST Ltd, 24 Green Street, Stevenage, Hertfordshire SG1 3DS. Tel: 0438 352150.

Saving the load

WHEN THE Spectrum was first launched there was an avalanche of Load/Save and On/Off switches released for it.

The Earlybird Simple Sonic provides the normal Load/Save switching so that you do not have to swap leads, and also has a Playback position. That sends the signal to a DIN socket on the box so that you can plug in your hi-fi: **Space Invaders** at 40 Watts a channel.

The switch on the front of the box also has a Clear position where, if a button is also pressed, it interrupts the power to the Spectrum to clear the memory. All in all, a simple little device and reasonably priced at £14.99, plus 70 pence p&p.

Early Bird, 31 Gleneagles Drive, Penwortham, Preston, Lancs PR1 0JT.



more hardware on page 56



Since the dawn of the computer age the prices of home computers have been steadily falling.

But, remarkably, the price of a genuine, full-blooded disk drive has remained almost constant.

Constantly expensive.

You'll be lucky to pick up a decent one for less than £200 in the shops.

Now, however, you can have one delivered to your doorstep for only £119.95 (including VAT and postage and packing).

The new Triton Quick Disk from Radofin.

Its specifications are every bit the equal of a £200 disk drive, as a glance at our card above will confirm.

Quick Disk uses the very latest technology to store up to 100K on high quality Hitachi Maxell double-sided 2.8" disks.

Its disk operating system (DOS) uses standard commands so it is truly easy to use, as any computer novice will be glad to hear.

While the price will be compatible with most wallets, there is a Triton Quick Disk compatible with most computers – Commodore 64, Spectrum (16K, 48K and Spectrum plus), Aquarius, Dragon 64 and all MSX Systems.

And, naturally, included is an interface box plus all connecting cables and instructions.

In short, what we deliver is a complete, genuine disk drive. Not a tape or wafer in sight. All for only £119.95.

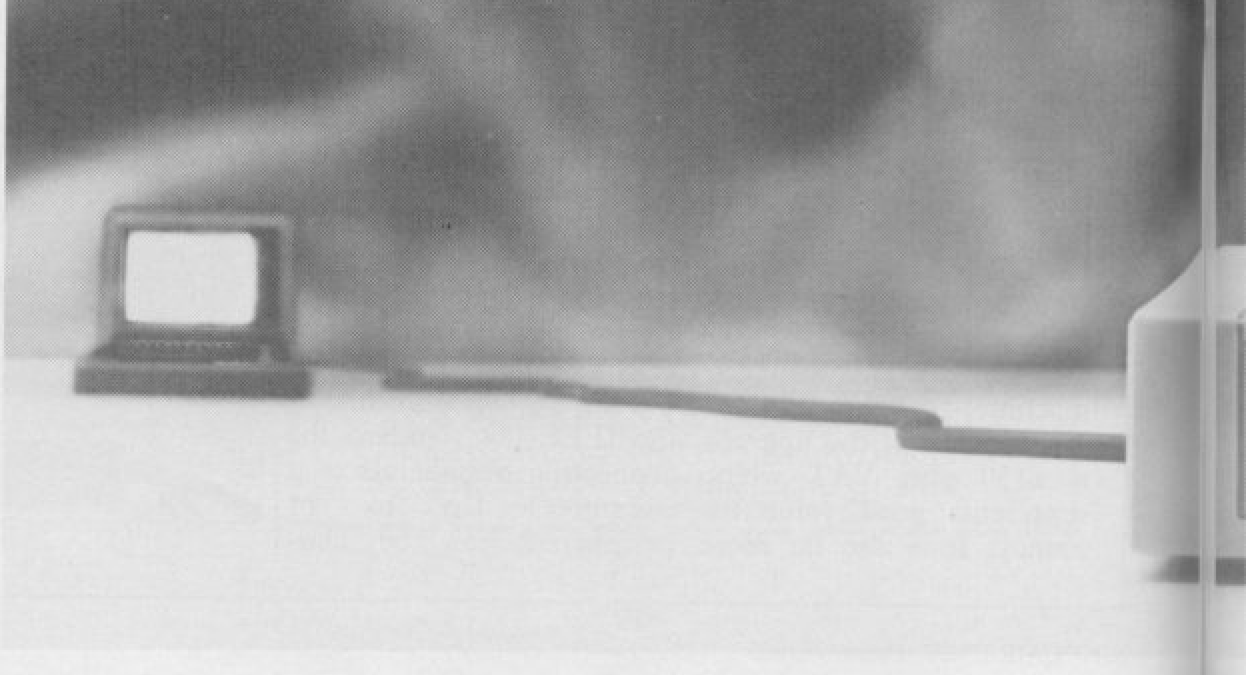
And when it comes to speed of loading, the Triton Quick Disk more than lives up to its name.

FROM 0 TO READY IN 7 SECONDS.

To put the Triton Quick Drive through its paces we used an ordinary computer game – Jet Set Willy.

From tape it took 170 seconds to load.

When loaded from the Triton Quick Disk it took a mere seven seconds. That is 163 seconds less than the tape and certainly as quick as most disk drives on the market.



Rough and ready Miracles

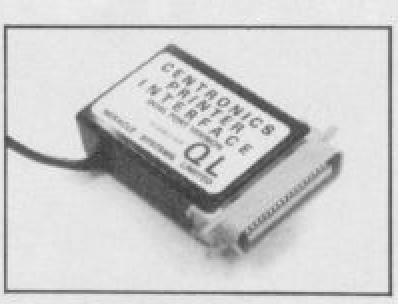
MIRACLE Systems has brought out two new QL products and announced an upgrade to its RS232 to Centronics Converter — considered by many to be the QL standard.

The Modapter overcomes the QL's inability to operate with a split baud rate, such as the 1200/75 used by Prestel. It can also cope with 300/300 and 1200/1200 full duplex. Each of those rates are selected by switches on of the Modaptor.

One end of the Modaptor plugs into the SER2 port of the QL with the other end terminating in a 25 pin Din plug. It can plug into any modem which has a similar socket, unfortunately, that excludes modems such as the Prism 1000 and other low cost modems.

The software supplied with the Modaptor — written by QCODE — is in two parts. You can use it to access Prestel and Micronet 800, or to emulate a VT52 terminal which allows access to bulletin boards.

The Prestel software is fairly rudimentary by Brightstar and Q-Comm standards but it works, and it can handle the fancy Micronet graphics.



Other than simply letting you look through the frames on Prestel this part of the software does little else. The VT52 terminal emulation is well written.

A multitude of control codes are available from the keyboard, enough to deal with any eventuality, even down to emulating the VT52 numeric keypad. Most useful, however, is the ability to assign strings to 16 of the keys. Users stuck in MUD will find it particularly helpful.

Overall, the package is a little rough around the edges and not quite up to the standard of other QL modem packages, but it is good value at only £39.

The Double Expander is designed to allow you to plug an interface and additional RAM into the QL at the same time.

Despite its homebrew look the expander works, and at £39 it is the cheapest way to plug two cards in at the same time. Its nearest rival is over twice the price.

Finally, the RS232 to Centronics converter has been altered so that it can be plugged into either SER1 or SER2.

Despite those changes the price of the converter remains at £29.95.

Miracle Systems Ltd, Avondale Workshops, Woodland Way, Kingswood, Bristol BS15 1QL. Tel: 0272-603871 ext 210.

Room to manoeuvre

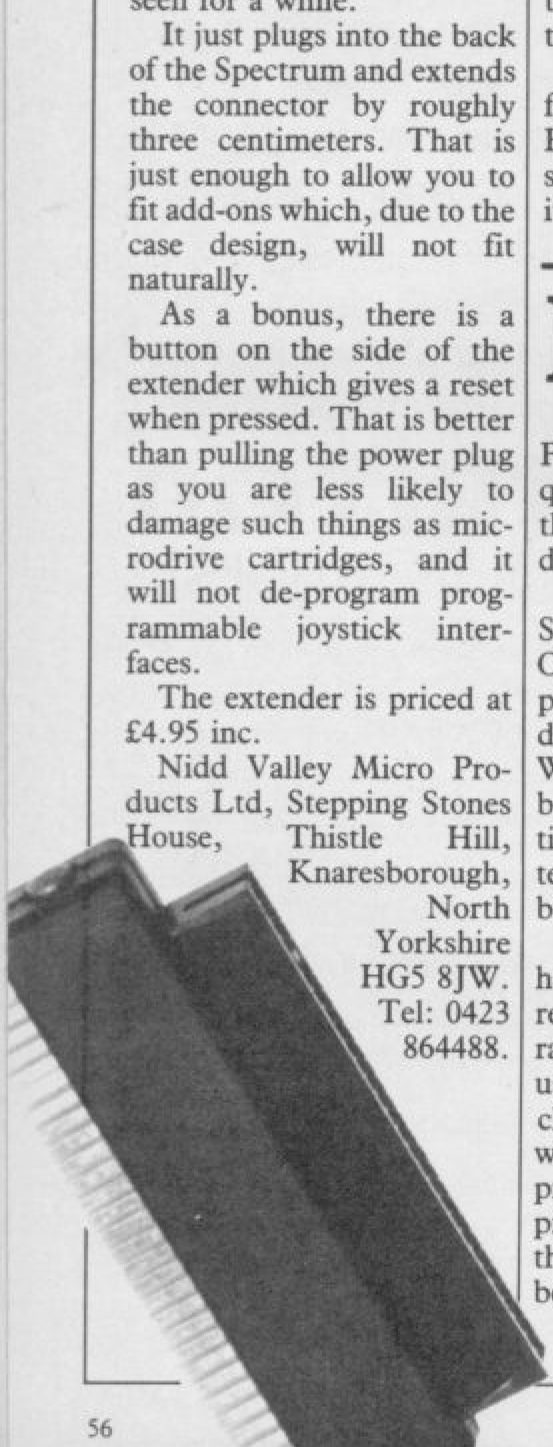
THE NIDD VALLLEY Extender Bar and Reset Button is one of the simplest pieces of hardware I have seen for a while.

It just plugs into the back of the Spectrum and extends the connector by roughly three centimeters. That is just enough to allow you to fit add-ons which, due to the case design, will not fit naturally.

As a bonus, there is a button on the side of the extender which gives a reset when pressed. That is better than pulling the power plug as you are less likely to damage such things as microdrive cartridges, and it will not de-program programmable joystick interfaces.

The extender is priced at £4.95 inc.

Nidd Valley Micro Products Ltd, Stepping Stones House, Thistle Hill, Knaresborough, North Yorkshire HG5 8JW. Tel: 0423 864488.



Back up your troubles

FAST WILL HAVE to be quick off the mark to stem the recent flood of back-up devices for the Spectrum.

The latest of those, the Spec-Mate from AT & Y Computing will back-up a program to tape, microdrive, disc drive – Beta – or Wafadrive at the press of a button, generally irrespective of whatever fancy protection techniques have been used.

As Spec-Mate does not have to be connected to reload the backed-up program, the potential for misuse is high. Hopefully, purchasers will not abuse it, as while backing-up your own programs is a necessity, piracy should be, and with the new copyright laws is being, stamped out.

In terms of ease of use, Spec-Mate falls between Interface III and the Microdriver, the latter being the easiest. Once a program has loaded, a button on the interface is pressed and the program freezes. From there on you have to type blind, that is, apart from the border changing colour there is nothing on the screen to show which keys you have pressed.

Once frozen you have to press a key to denote how the program should be saved, to tape, disc, or to examine the screen. Software houses are getting wise to those sort of devices and sometimes put data on the screen. Examine allows you to remove the colour and reveal any data hidden there.

Spec-Mate needs some of the Spectrum's memory and uses the screen for storage. It allows you to specify which part of the screen it uses which should overcome most protection problems.

Now the program can be saved, with or without a screen display, so that microdrive users can get two programs on one cartridge. You have to type in a filename blind, but once you get used to it the process is reasonably easy.

Spec-Mate is straightforward to use and has the advantage that if you use microdrives and want to change to discs at a later date you can still use it. The price, £39.95 inc seems to be average at the moment.

AT & Y Computing Ltd, 35 Villa Road, London SW9 7ND. Tel: 01-733 6175.



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— Sinclair User Classic October 85 —

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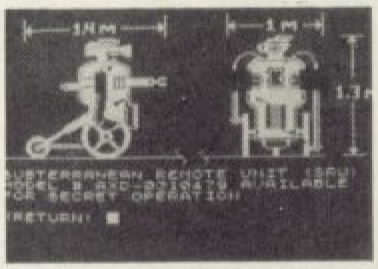
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Nato Alert



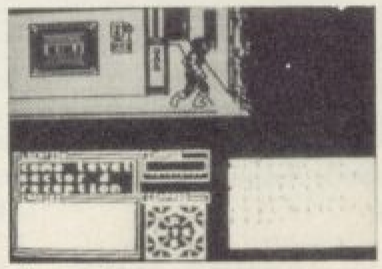
Shadow/Unicorn



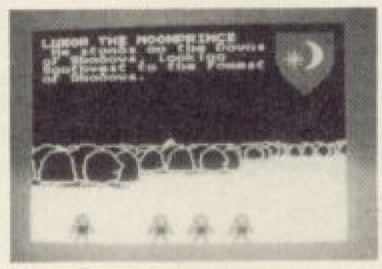
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MARSPORT

"This is what the kids have been waiting for, an adventure game with destruction as well! The best yet from Gargoyle!" (Popular Computing Weekly) "Just watch John Marsh shoot ... it is one of the best animation sequences ever seen on a Spectrum!" (Crash) Dun Darach in space? Not really, but Commander John Marsh has the same walk as Cuchulainn. Brilliant animation, with much improved 3D. DEMO and SAVE available. (Gargoyle) **Cassette £9.95**

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A fistful of registers

The register set has a shadow which streamlines code. Marcus Jeffery explains

THIS MONTH, we are going to look at a number of previously unmentioned registers. Those are the index registers and the alternative register set.

Although they can be very useful at times, there is nothing they can do which is not equally possible with the registers we have been using in previous articles. Consequently, rather than giving an example program using the new instructions, we will look at a few other useful tricks.

Let's consider the index registers, of which there are two, labelled IX and IY. They are both 16-bit registers, similar to the BC, DE and HL register pairs, but unlike the latter, they cannot be split into individual byte sizes. The most common form of the index register is:

(IX+disp)

where disp is an eight-bit signed integer. That means that with lists, arrays and other table data, an index register can point to, say, a row of items, then: (IX+0) is the first item, (IX+1) is the second item, (IX+2) is the third item, and so on. The main limitation is the size of the displacement value. Being only eight-bits, it can only contain numbers in the range −128 to +127.

Figure five shows all the new instructions available using those registers. In general, the index registers are not used very frequently because of the extra time and memory required when using them. That is because an extra byte is required in each instruction simply to tell the computer that an index register is being used.

During the past few months, I have included a number of machine code routines which require a parameter to be passed to them. For instance, the first article — May 1985 — had a routine which would set all the screen attribute bytes to a particular value. To do that, we had to tell the machine what value to use and then POKE the value into location 60000, then read it into register E.

That method has a number of disadvantages. To begin with it makes the Basic program less readable, with seemingly random POKEs scattered here and there. More importantly, it makes the code position dependent. In other words, if we were to move the code further down in memory to make way for some other data, then not only will the Basic POKE location have to change, but the machine code instruction which loads location 60000 into the E register will also have to be changed, then the assembly code reassembled at the new location.

Fortunately, using one of the hidden secrets of the Spectrum, we can devise a more satisfactory method of passing parameters to machine code. Our new method makes use of the normal parameter organisation in Basic function calls. Imagine you had a Basic funtion defined as:

DEF FN a(x) = 5★x

When you call that function, you have to supply a value for the argument x. Naturally, the computer has to keep a record of the value, so that it can use it to calculate 5★x in the function. That is where the Spectrum manual comes to the rescue.

Look at the section on system variables where you will find reference to a couple of bytes with the mnemonic DEFADD, which point to the "address of arguments of user-defined function if one is being evaluated; otherwise zero". That means if we get the contents of the two bytes 23563

Figure 1. Assigning parameters in machine code

```
                                ORG    60000
                                LOAD   60000
EA60   DD2AOB5C  SETREG         LD     IX,(23563)   :IX=Contents of DEFADD
EA64   DD7E04                   LD     A,(IX+4)
EA67   DD460C                   LD     B,(IX+12)
EA6A   DD4E14                   LD     C,(IX+20)
EA6D   DD561C                   LD     D,(IX+28)
EA70   DD5E24                   LD     E,(IX+36)
EA73   DD662C                   LD     H,(IX+44)
EA76   DD6E34                   LD     L,(IX+52)
                                :CALL ROUTINE HERE
EA79   C9                       RET
                                END
```

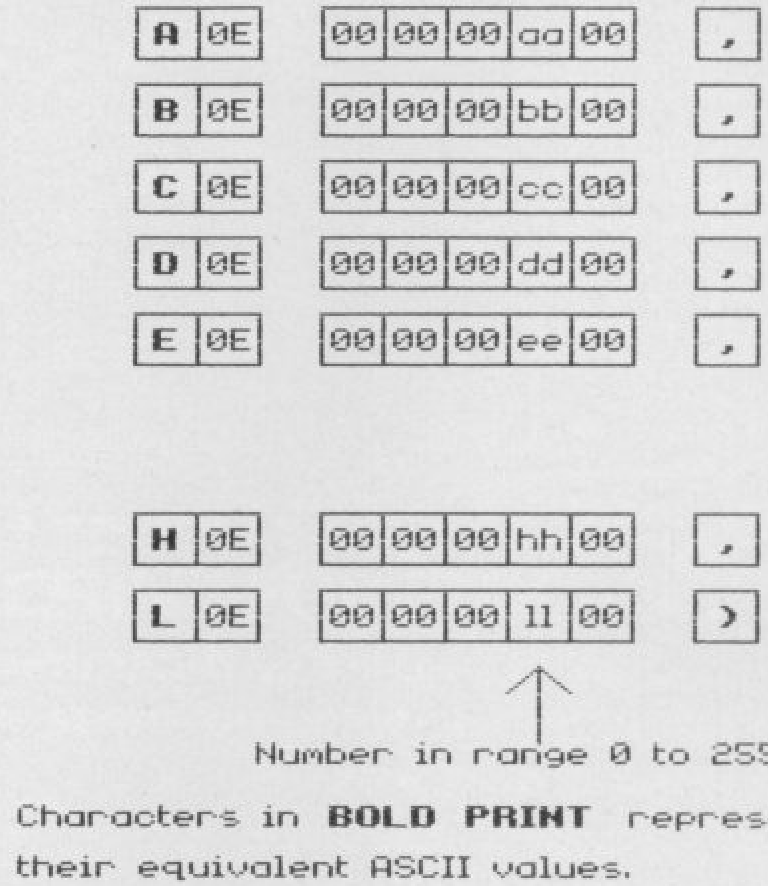
Figure 3. Assembly code colour change

```
                                ORG    60000
                                LOAD   60000
EA60   DD2A0B5C  COLOUR         LD     IX,(23563)   ;IX=Contents of DEFADD
EA64   DD5E04                   LD     E,(IX+4)     ;E=Value of new attribute byte
EA67   210058                   LD     HL,22528     ;HL=Start of attribute file
EA6A   010003                   LD     BC,768       ;BC=Number of screen positions
EA6D   73        LOOP           LD     (HL),E       ;Place attr. byte into file area
EA6E   23                       INC    HL           ;HL=Next byte in file area
EA6F   0B                       DEC    BC           ;Count the changed locations
EA70   78                       LD     A,B
EA71   B1                       OR     C            ;Jump to LOOP if BC is
EA72   20F9                     JR     NZ,LOOP      ;     still greater than zero
EA74   C9                       RET
                                END
```



Illustration: Stephen Wright

Figure 2. Function arguments



and 23564, they will tell us exactly where the computer has stored the values passed to the function we have just called. It is all rather convenient, and can be used to pass values to position independent machine code.

The only other item of information we need is how to decipher floating point numbers, which is how the Spectrum will hold those values. That can be complicated, but we will only ever be dealing with numbers in the range 0 to 65535, since that is the maximum value which can be stored in a register pair. Having limited ourselves to that range, floating point numbers will always be of the five-byte form:

00 00 LL HH 00

where LL is the low-byte and HH is the high-byte to give the two-byte number HHLL.

In addition, there will be two bytes preceding that value, giving the ASCII code of the single character variable name, followed by the value 14 (OE in hex). There will also be a single byte after the number containing the ASCII code for a comma, unless it is the last argument of the function, in which case it will be the closing bracket.

That is all we need in order to write a function which will call a machine code routine and set values to all our registers simultaneously. The Basic function will look something like:

DEF FN a(A,B,C,D,E,H,L)
= USR location

continued on page 64

Figure 4. Basic program

```
   5 DEF FN a(E)=USR 60000
  10 CLEAR 59999
  20 GO SUB 1000
  30 CLS
  40 FOR i=1 TO 704
  50 PRINT CHR$ (25*RND+65);
  60 NEXT i
  70 INPUT "Attribute value = ";
att
  80 LET att=FN a(att)
  90 GO TO 70
 100 STOP
 110:
 120:
1000 REM HEX LOAD ROUTINE
1010 DEF FN p(x)=CODE h$(x)-48-7
*(CODE h$(x)>=65)
1020 LET byte=0
1030 RESTORE 2000
1040 READ start
1050 READ h$
1060 IF h$="*" THEN  GO TO 1160
1070 IF LEN h$<>2*INT (LEN h$/2)
 THEN  PRINT "Odd number of hex
digits in: ";h$: STOP
1080 FOR i=1 TO LEN h$
1090 IF NOT ((h$(i)>="0" AND h$(
i)<="9") OR (h$(i)>="A" AND h$(i
)<="F")) THEN  PRINT  "Illegal h
ex digit: ";h$(i): STOP
1100 NEXT i
1110 FOR i=1 TO LEN h$ STEP 2
1120 POKE start+byte,16*FN p(i)+
FN p(i+1)
1130 LET byte=byte+1
1140 NEXT i
1150 GO TO 1050
1160 PRINT "Code entered"
1170 PAUSE 150
1180 RETURN
2000 DATA 60000,"DD2A0B5C"
2010 DATA "DD5E04","210058"
2020 DATA "010003","73","23"
2030 DATA "0B","78","B1"
2040 DATA "20F9","C9","*"
```

continued from page 63

where location is the start location of our machine code routine. Figure one shows the assembly code to set the appropriate variables, and figure two shows the format of the numerical arguments, explaining the displacements from IX in the assembly code.

We are now in a position to rewrite our first ever machine code program. The assembly code is given in figure three. The major change is that IX is set to the contents of DEFADD, and the E register is then loaded with the function argument value, rather than from location 60000 as previously.

If we want to change the location of the machine code routine, all we need to do is move our machine code, then change the functon definition in the Basic program, making it truly relocatable. Just to prove that all this really works, figure four gives a Basic loader with the appropriate function.

Before looking at the alternate register pairs, it is worth pointing out that the value of IY will be initially set to 23552 — 5C00 in hex — which just happens to be the start of the Spectrum's system variables. Those locations are important to many Spectrum routines, and it uses displacements from IY frequently. Consequently, if you are using the IY index register and also calling Spectrum ROM routines, then it is a good idea not to change its value.

There is nothing to stop you using displacements from IY to change system variables, and you can achieve some very interesting effects.

Now for the alternate registers. Those are simply a second set of the registers A, B, C, D, E, F, H and L. There is no way in which you can mix both the normal registers and the alternate registers, but you can easily access them independently. There are a number of advantages in doing that, concerned mainly with both speed and time. Imagine you want to save the values of some of the registers for use at a later date, say whilst calling another routine. The most common method of doing that is to stack the register pairs, then unstack them at the end of the CALL.

That method requires 11 bytes — one for each PUSH/POP and three for the CALL — and will take 101 clock cycles to execute — 11 for each PUSH, 10 for each POP, and 17 for the CALL. Now let's consider the same problem, saving the register values by exchanging to the alternate registers:

```
EX      AF,AF'
EXX
CALL    routine
EX      AF,AF'
EXX
```

That now uses only seven bytes and takes only 33 clock cycles to complete.

Finally, a word of warning for anybody using the alternate registers and calling machine code from Basic. To call any machine code routine from Spectrum Basic, the USR instruction is used, either as part of a PRINT, or RANDOMIZE.

The problem is that the Spectrum ROM handles this line interpretation as an arithmetic calculation, and calls its calculating routines. On return to Basic, the routine to deal with the end of the calculation is called, and one of the things that does is to reset the IY index register to the start of the system variables.

Unfortunately, the very important value of the HL' alternate register pair is not reset to the hexadecimal number 2758 to allow a correct return to Basic. So, by all means use those registers but, if you have called the routine from Basic, make sure that the value 2758H is placed back into HL' before returning.

Figure 5. New Z80 instruction codes

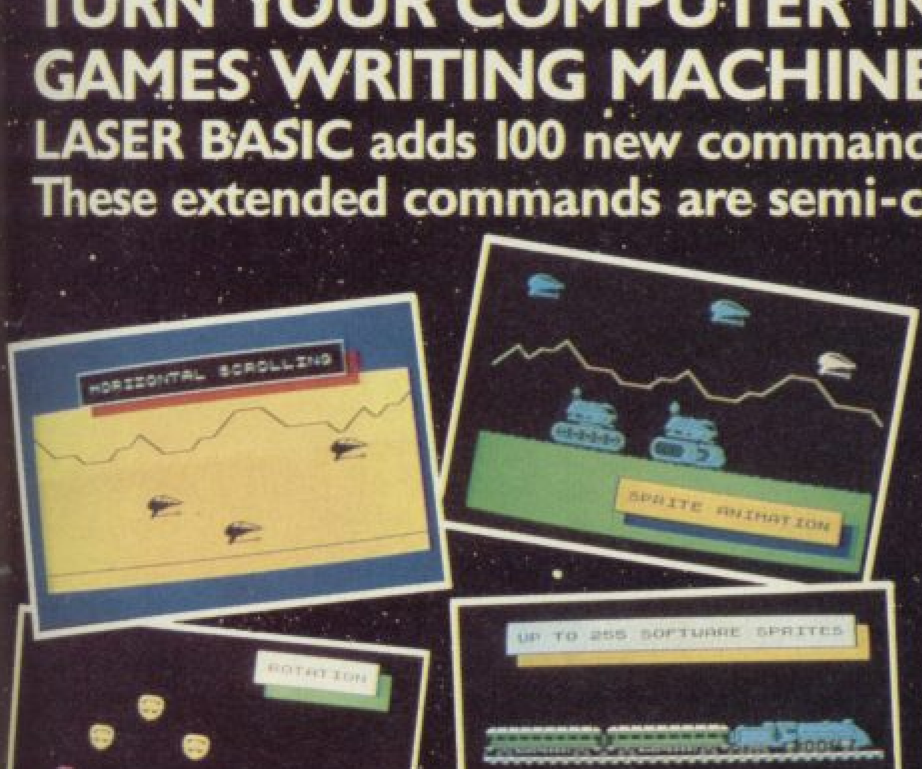
ADC	A,(i+d)	— Add the contents of location (i+d) and the carry flag to the accumulator
ADD	A,(i+d)	— Add the contents of location (i+d) to the accumulator
ADD	i,rp	— Add the register pair (BC,DE or HL) to the index register
ADD	i.i	— Add the specified index register to itself. It is not possible to add one index register to the other
AND	A,(i+d)	— AND the contents of the location (i+d) with the accumulator
BIT	b,(i+d)	— Test bit 'b' of location (i+d). Set the Zero flag if this bit is zero
CP	(i+d)	— Compare — by temporarily subtracting — the contents of location (i+d) with the accumulator
DEC	i	— Decrement the index register by one
DEC	(i+d)	— Decrement the contents of location (i+d) by one
EX	(SP),i	— Exchange the contents of the top of the stack with the contents of the specified index register
INC	i	— Increment the index register by one
INC	(i+d)	— Increment the contents of location (i+d) by one
JP	(i)	— Jump to the address specified by the contents of the index register
LD	i,(addr)	— Load the contents of the locations 'addr' — low-byte — and 'addr+1' — high-byte — into the index register
LD	i,word	— Load the 16-bit word into the specified index register
LD	reg,(i+d)	— Load the contents of location (i+d) into the specified register
LD	SP,i	— Set the Stack Pointer to the contents of the index register
LD	(addr),i	— Place the contents of the index register into locations 'addr' and 'addr+1' — low-byte first
LD	(i+d),byte	— Place the byte value into the location (i+d)
LD	(i+d),reg	— Place the contents of the specified register into location (i+d)
OR	(i+d)	— OR the contents of location (i+d) with the accumulator
POP	i	— Remove the top two bytes from the stack, placing the contents into the index register
PUSH	i	— Place the 16-bit index register value on the top of the stack
RES	b,(i+d)	— Reset bit 'b' of location (i+d)
RL	(i+d)	— Rotate the contents of location (i+d) left by one bit, through the carry flag
RLC	(i+d)	— Rotate the contents of location (i+d) left by one bit circular
RR	(i+d)	— Rotate the contents of location (i+d) right by one bit, through the carry flag
RRC	(i+d)	— Rotate the contents of location (i+d) right by one bit circular
SBC	A,(i+d)	— Subtract the contents of location (i+d) from the accumulator with carry
SET	b,(i+d)	— Set bit 'b' in location (i+d)
SLA	(i+d)	— Shift the contents of location (i+d) left by one bit
SRA	(i+d)	— Arithmetic Shift the contents of location (i+d) right by one bit
SRL	(i+d)	— Logical Shift the contents of location (i+d) right by one bit
SUB	(i+d)	— Subtract the contents of location (i+d) from the accumulator
XOR	(i+d)	— Exclusive–OR the contents of location (i+d) with the accumulator
EX	AF,AF'	— Exchange the A and F registers with the alternate A' and F' registers.
EXX		— Exchange the B, C, D, E, H and L registers with their corresponding alternate registers

where:
i — represents either IX or IY
d — represents an 8-bit signed displacement

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FERGUS MCNEILL waves a can of Right Guard anti-perspirant and suggests torching a few flies with it by igniting the spray and hoping his hand doesn't get blown off. Isn't that dangerous? Of course it is, says Fergus. But everybody does it. Don't they? Well, Fergus . . .

Dissuaded from courting suicide at the beginning of the interview, Fergus sits down on the end of his bed and puts a Marillion tape on his hi-fi. Dedicated fans of Delta 4 will know of Fergus' abiding love for Marillion, even if the rest of us think it sounds just like Genesis.

"You'd better not say that to Judith when she comes," warns Fergus, "or she'll pull her knife on you." Dedicated fans of Delta 4 will know of Fergus' abiding love (?) for Judith. He bought her the knife.

Fergus McNeill is the nutter behind Delta 4, which he formed while at school with a few friends. He's 16 now, studying A-levels in Psychology and Communications at Sixth Form College. Delta 4 specialises in Quilled adventure games of surreal and lunatic quality, satirising the software industry, and any other targets which present themselves, with dedicated venom and wonderfully imaginative humour.

"Years ago I bought a ZX 81 and outgrew it in ten minutes," says Fergus, "So I bought a Spectrum and a copy of **Quill** and wrote the **Dragonstar** trilogy. It was like **Classic Adventure** but without the interesting bits. You can still buy it, it costs £4.95 and it's much better now."

Fergus gazes longingly at the Right Guard, clearly bored with all the ancient history. He finally coughs up the story of how he came to write **Quest for the Holy Joystick**, a spoof of the software industry and ZX Microfairs.

"We were so naive we didn't realise we were supposed to send out review copies."

The tale is extremely boring, particularly as it features the monstrous Tony Bridge of *Popular Computing Weekly*, which magazine is strongly featured in the Joystick games. Unwittingly Fergus had hit on the ideal way of getting media coverage without spending money – feature the magazines in the games.

The follow-up was **Return of the Joystick**, designed "in between selling the odd game every forty minutes" at a Microfair. When Gilsoft released the **Illustrator**, to add pictures to the **Quill** adventure writing program, graphics were incorporated and the sequel released.

"A joystick finale is still in the pipeline," says Fergus. It's to be called **Joystick III – The Search for Yaz**, and you'll probably have to play **Return of the Joystick** to fully appreciate the point of it all.

Now we move on to the subject of Judith, Fergus' ex-girlfriend who's already been featured by the insensitive Gremlin last September. "Judith came to school with a book, *Bored of the Rings*. We wrote to the publishers, Harvard Lampoon, but nobody seemed to have heard of them. So we thought, we can't do the book, it's too obscene. Let's do our own. So we wrote the game, and took it round all the London mags the next day, and behold everyone loved it, and it even got a *Sinclair User* Classic. Reviews are life and death for a small company. On an arcade game a *Crash* Smash and a *Sinclair User* Classic are about the same, but on an adventure game a *Sinclair User* Classic is worth a lot more."

That leads Fergus into a long discussion of what adventure games ought to be like. **Bored of the Rings** is a three-part extravaganza now marketed by Silversoft, which has given Fergus the break he needed to sell games through a company with an advertising budget, and money to pay duplicators and the like.

For graphics, he rates Adventure International, but hates the plots and text interpreter. Level Nine he says are 'odd' but have the best text. "Melbourne House has the best text interpreter, and it usually messes it up. But I do rate them very highly."

The atmosphere becomes tense, as Judith draws nearer to Fergus' office/bedroom/den. The posters of the Thompson Twins, Eurythmics, Marillion, **Great Space Race**, *Sinclair User*, Porsche 928 and Bronski Beat begin to ooze blood in anticipation. One particular poster above his bed is an anti-pollution guide. The circle in the centre is now red, which means 'Evacuate Immediately'.

Meanwhile Fergus is explaining about his Scottish roots. "Everyone up there is obsessed by football," he says. "People ask me 'Do you support Rangers or Celtic?' and I say 'No, I'm an atheist.' I used to like Queens Park, a miniscule team with the right to play at Hampden Park. There were only



Delta 4 created the classic Bored of the Rings. Chris Bourne meets Deperado and the Jester . . .



Bored out of his skull

about 20 people watching."

Fergus doesn't even like arcade games, the heretic. "I hate them. I only play them very briefly. I like **The Rocky Horror Show** to be patriotic, and **Dark Star** and **Alien 8. Don't Buy This** was the best from Firebird in a long time. We had good fun with **Way of the Exploding Fist** at the PCW show, pretending to be very stupid and letting a Melbourne House official explain it to us."

Suddenly Judith erupts into the office like a boil whose time has come. Water pistol in fist, she sprays us in revenge for our unkind cut of a few months back. Let it go on record – if you ignore the leather jacket, studs, sharpened nails, knife, and Marillion T-shirt Judith Child is an otherwise demure, attractive and courteous young woman of obvious talent.

Judith is working with Fergus on **Robin of Sherlock**, the next three-part mega-quest from Delta 4. It's a step forward for Quilled adventures because it allows you to move backwards and forwards between the three separate programs, and also features independent characters doing things to each other behind your back.

Apart from Robin Hood and Sherlock, other characters include Red Riding Hood, Goldilocks, sequences from the Wizard of Oz, Smurfs, Wombles, laxatives, vaseline – "don't forget the candles," says Judith – an Exploding Friar Tuck, Hurn's (*sic*) Garden Shed – "there's a lot of those" – and an NCP car park which follows you wherever you go.

At the beginning of the game Watson is dead, but Fergus hasn't yet decided whether or not to have him sit up later and say suitably meaningless Melbourne House-type things.

"Watson is an idiot. The sofa is an idiot. Things I can see . . ." observes Fergus.

Fergus has never sat down and written a machine code game and says he probably never will. "**Bored of the Rings** is the **Quill** and other people's routines hacked about a bit," he says.

Judith is looking around the bedroom, change-spotting. "Oh God," she says, with blood-curdling scorn, "he's personalised the number plates on the Porsche poster."

She requires a certain amount of persuasion to appear in the photo-session, and brandishes the knife meaningfully. Eventually the lure of the lens overcomes her, and the inter-

continued on page 69

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continued from page 67

view continues as she poses with Fergus and Ian Willis, who has now joined the merry throng.

Ian programs on the BBC and QL – he's currently converting **Bored of the Rings** for the black beast. Other contributors, not present, include Jason Somerville, who works on the Amstrad and Jon Walker who does artwork and 'general scribbling'.

"Andrew Sprunt – we call him Spud – does photography and stuff," adds Fergus.

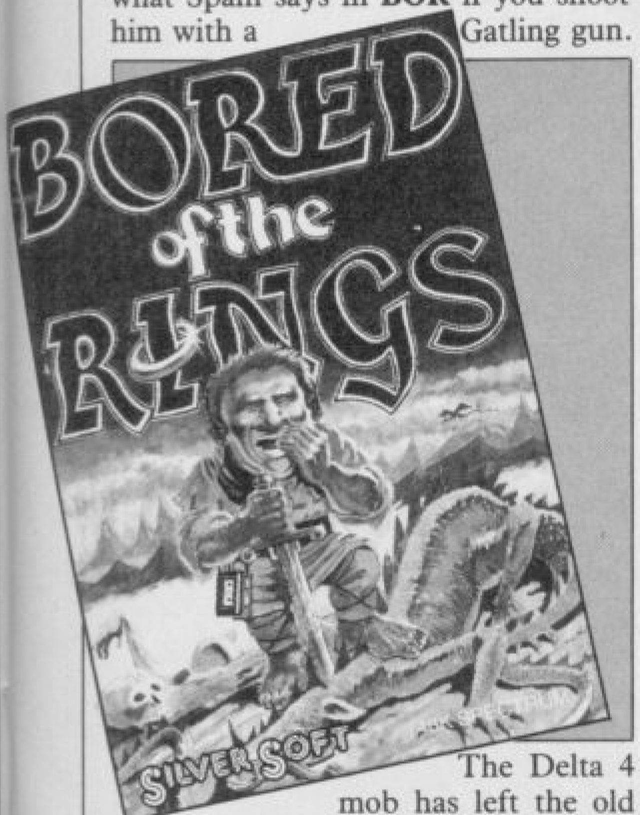


Ian and Judith express their opinion of Fergus' latest system for dividing the profits

"Jason's a squirt," says Judith. "He's not very nice to me. Ask him how Jill is . . ."

"Jason is really small," explains Fergus. "He doesn't have any glaring features. Jon is more interesting than Spud. Spud tries to arrange million pound mergers with people. He's hilarious.

"My bullet-proof jerkin is like a shield of steel" he intones, apparently as an example of Spud humour. It's what Spam says in **BOR** if you shoot him with a Gatling gun.



The Delta 4 mob has left the old school and they are doing things at different sixth form colleges. Fergus waxes nostalgic about the good old days at school, and that warms up Judith, whose conversation has hitherto been limited to cutting observations dropped into the proceedings like a frozen burger into hot fat.

"Tell him about Nilrac," says Judith.

Nilrac turns up as a character in **Skeptical**, the bonus 'magazine' included with **Bored of the Rings** on side four.

"He's awful," says Fergus.

"He's a penguin," says Judith.

He's the man who took the computer studies course at their old school, that's who he is.

"He doesn't like Thatcher . . . he doesn't like anything," says Fergus.

"He likes Bruce Springsteen," comments Judith. Is that a redeeming feature?

This takes us into the realm of how computing ought to be taught in schools. Fergus reckons what counts is hands-on experience, not just learning how to do it in theory. According to Fergus, if it was all theory, "there'd be no programmers."

Teachers have to cope with a lot of problems in teaching computers. In the first place, they may not know much themselves, and what's more they may get people like Delta 4 to teach. But that won't impress frustrated pupils.

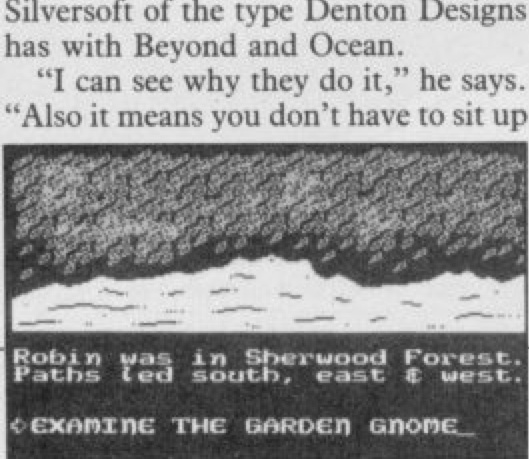
It's much the same story with most young programmers, of course – though maybe not so vociferously expressed. Programming begins at home. Could a similar bunch of schoolkids make a go of it today, the way Delta 4 has?

"Not the way we did," says Fergus. "**Bored of the Rings** was the first really excellent product we've done. People starting now would get eaten up."

He says he'd consider working for other companies "but only certain ones, and not on the basis of going into a room every day and writing stuff."

His aim is to set up a deal with Silversoft of the type Denton Designs has with Beyond and Ocean.

"I can see why they do it," he says. "Also it means you don't have to sit up until one in the morning putting horrible little cassette inlays in boxes."



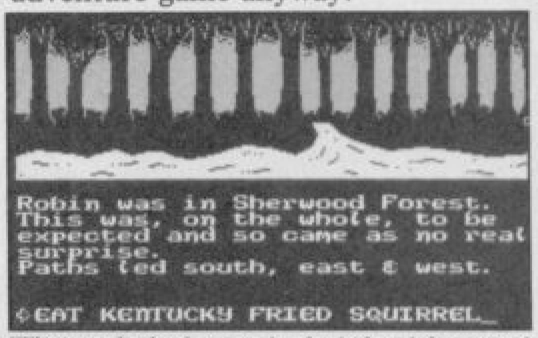
But isn't it a bit sad to see Silversoft all over the game and not Delta 4?

"Yes, it is galling. I want me promoted, or Delta 4. They even spelled my name wrong on the insert."

Names will matter less in future, since Fergus and the rest of them are all due to die soon in **Joystick III**. Fergus commits suicide, and there's a tasteful picture of the event on his bedroom wall.

After that, the games will be written under pseudonyms. Fergus is calling himself the Jester, and Judith wants to be Desperado, though she's thought about Razzle.

Fergus finally gives into temptation and unleashes the full power of the blazing Right Guard. Gentle readers, do not try this yourselves. You are not manic programmers, and you are not about to commit suicide in a Quilled adventure game anyway.



Who are the burly nuns in the industrial convent? And where does Marian leave her clothes when she goes bathing? Robin of Sherlock knows the truth

It seems like a good time to make an exit. We'll have to leave the horror of the Delta 4 experience in the Stratford Pizza Chef to another episode – nor is there time to find out what happens if you type CHRIS BOURNE as an instruction in the third part of **Bored of the Rings**. If you get a diatribe against *Home Computing Weekly* you've typed HCW instead.

"If anybody says Marillion sounds just like Genesis," says Judith, fingering her blade, "I'll squirt them again."

Word Processing with QL Quill

IT IS GOOD to see such a rabid interest in the Psion business packages but, with the dearth of books on other QL subjects, it's about time a halt was called to the production line.

The latest off the conveyor belt is *Word Processing with QL Quill*, by David Dempsey. His book is a practical tutorial with exercises at the end of each section, and information accompanied by diagrams.

Unfortunately, the book is a bit of a slow starter. The first two chapters describe the functions of a word processor and show how **Quill** is loaded into the QL.

By page 52 we have learnt how to make back-up copies and Dempsey has explained the characteristics of QL cartridges.

That page is the turning point of the book, which goes on to describe formatting techniques and advanced editing features such as the import command.

The Sinclair **Quill** manual gives few examples of how to set up a document with margin settings, underlining, and various typefaces. It also gives a garbled account of how to set tabulation points on a page. That is one of the most difficult aspects to understand, and Dempsey gives a simple and readable explanation.

The section on advanced editing covers such topics as placing headers on the page, and importing text from a file produced by one of the other Psion packages. It is a lucid and well designed account of those processes.

The final chapter of the book looks at printing, a topic which is largely ignored in the manual. Although he says little about the types of printer you can use with **Quill** – a glaring omission – Dempsey does provide a survey of the types of printing you can do.

The only other book which can be compared in terms of quality with Dempsey's is **QL Quill**, from Century. There is little between them.

Word Processing with QL Quill is for both the business and home user who wants to know more about the machine as well as the package. The combination works well, and if you are interested in the esoteric aspects of QL usage, then the Longman book is a perfect buy.

John Gilbert

Publisher Longman
Price £7.95 (paperback)
★★★★★

The Programmers' Trouble Shooting Guide

IT SHOULD BE the answer to all Spectrum programmers' dreams, but *The Programmers' Trouble Shooting Guide*, by Piers Letcher, is no more than a witch's brew of hackneyed programming ideas and solutions presented in a new format. It is for those people who are not merely beginners, but who have not even bought their computers.

The introduction to the book contains a table listing the types of problems you may encounter with your computer, together with the chapters which cover those instances. For example, if you are unable to run a program, it may be because of typing errors, corrupted memory or locked-in machine code. The answers to those weighty posers are found in chapters two, nine and eleven. They could just as easily be found in the chapters on editing, and memory configuration in the Spectrum manual.



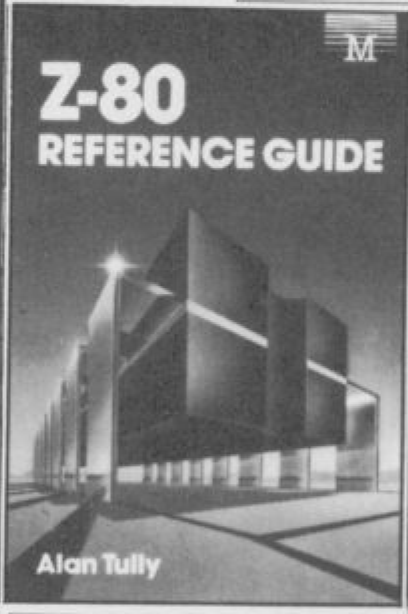
The list will probably get you thinking that at last you have everything you need to know in one book but, unless you are an absolute beginner you will have probably come across such information before.

The first six chapters do little to expand on the information given in the Spectrum manual, but the sections on animation, sound and memory are of some use if you have not bought any other books already on the market. There is also a chapter on machine code and appendices, most of which look as if they have been taken from the Spectrum manual.

Letcher's book suffers from a disease found in many compendiums. He has only been able to scratch the surface of topics which require books and not chapters to explain adequately. You would, therefore, be better off looking elsewhere for an indepth treatment of graphics and machine code programming. If, however, you are a beginner the book may provide an easy launch pad to better computing.

John Gilbert

Publisher Century Communications
Price £7.95 (paperback)
★★★



The Z-80 Reference Guide

IF YOU ARE still enamoured with the Spectrum Z-80 processor you may have noticed the lack of good reference material about the instruction set.

There are few books which catalogue the instruction set, show the timings of each command, with examples of usage. *The Z-80 Reference Guide* comes as a pleasant surprise.

It starts with an introduction to the register sets and a general explanation of timings for each type of instruction. A page is devoted to each instruction giving a general description of usage, the number of bytes used by each, the flags affected by execution.

The book bears a striking resemblance to *The Z-80 Programmers' Reference Guide*, by Rodney Zaks. That includes a comprehensive course on Z-80 programming, something which Tully's book omits apart from a puny chapter giving hints and tips.

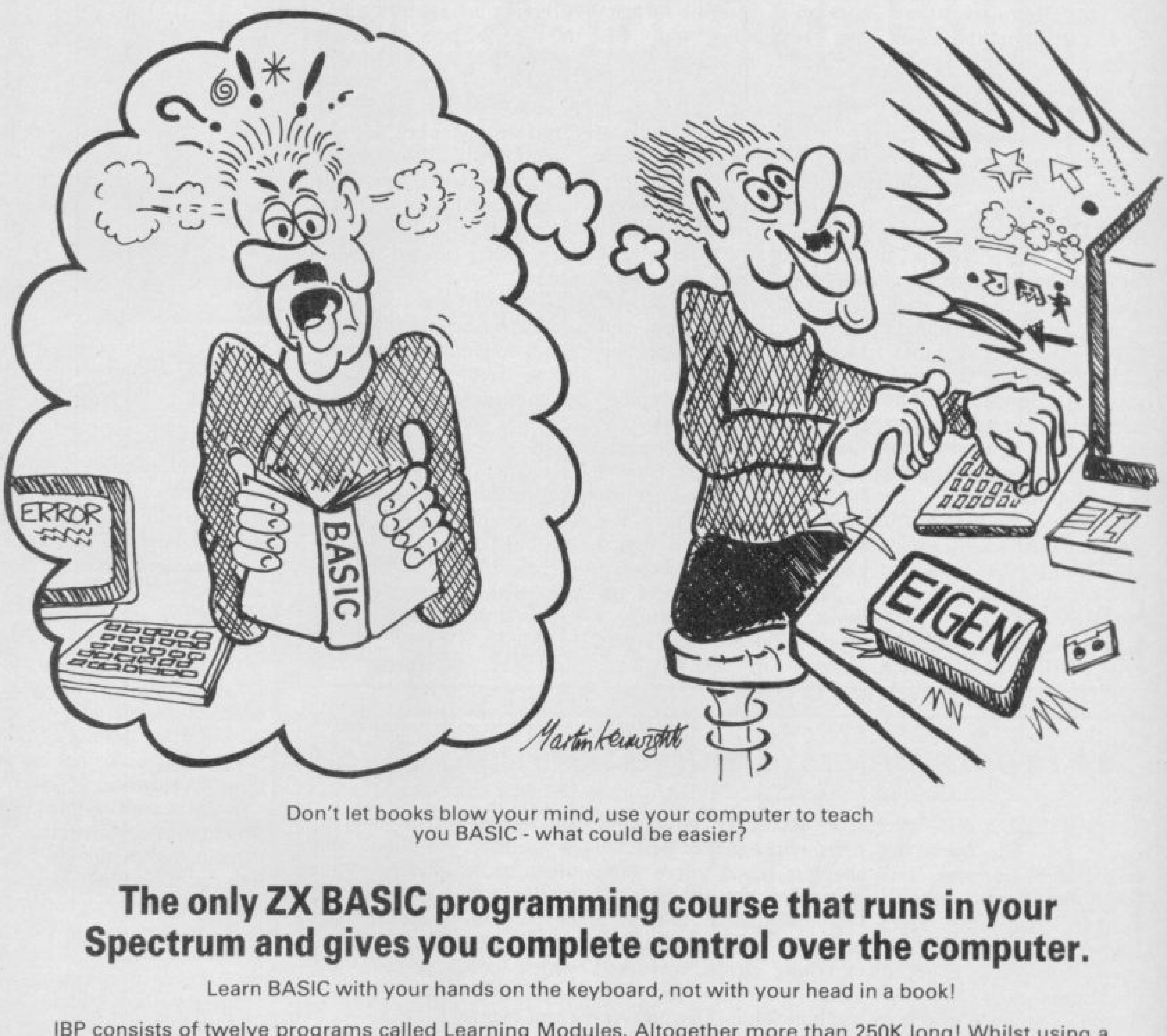
Tully's book will never beat Zaks'. It is, however, useful for beginners who want a quick reference to a particular instruction.

John Gilbert

Publisher Melbourne House
Price £9.95 (paperback)
★★★★

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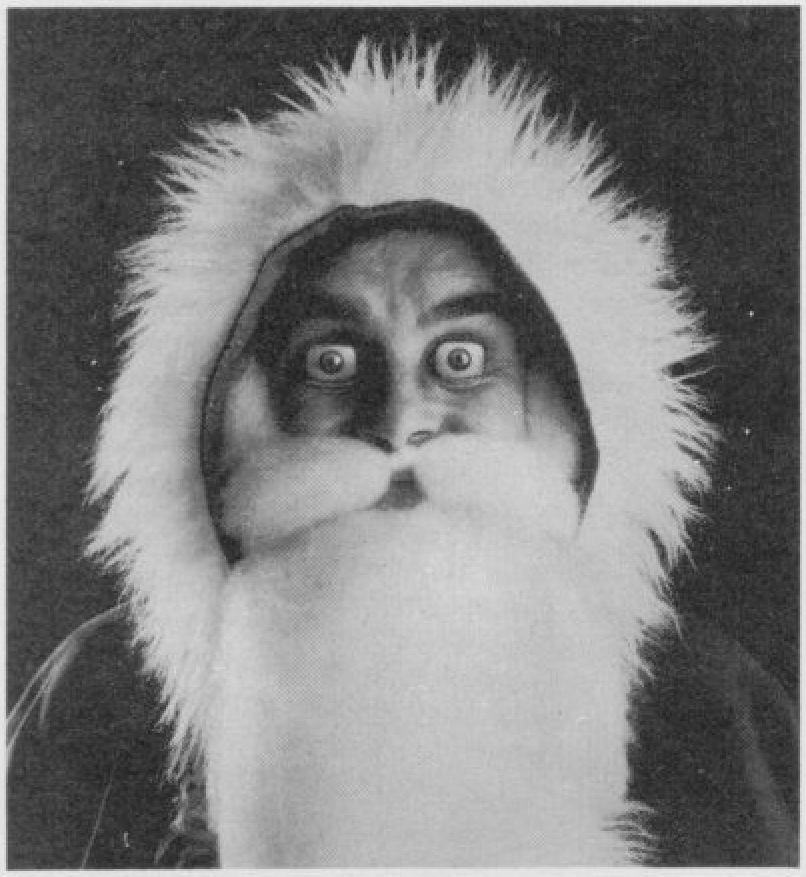
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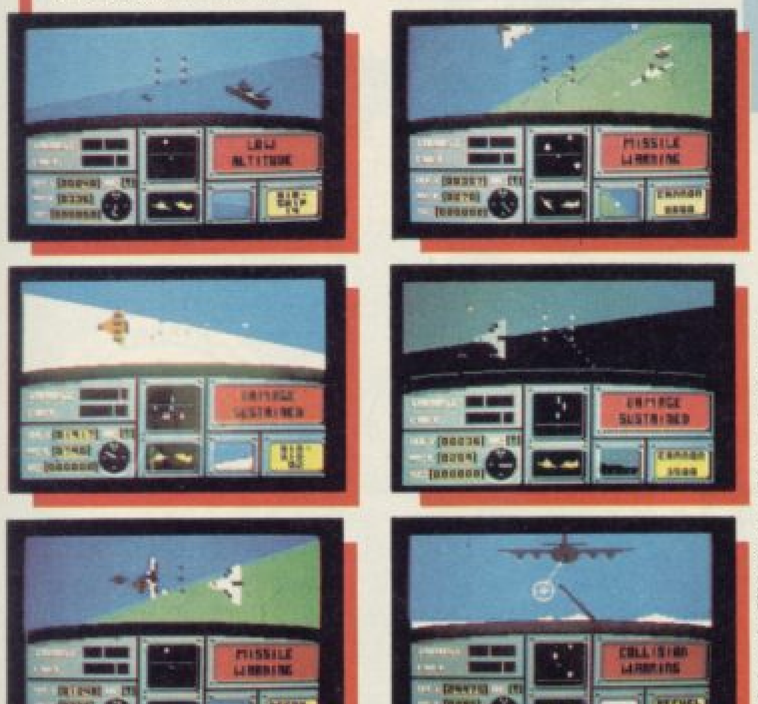
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SU/12

Bill Scolding meets biographer Rodney Dale, the 'warts and all' author of The Sinclair Story

Sinclair brought to book?

RODNEY DALE has known Sir Clive Sinclair for more than 20 years, ever since the Sinclair Radionics mail order operation was run from a disused bakehouse on Dale's premises in Cambridge.

Dale was involved with the development of the extraordinary and innovative Cambridge Consultants Ltd, which he later joined, forsaking his small publishing business. His path was to intersect with Sinclair's often in the years to follow. Later, when Dale became a fulltime freelance writer, he supervised the production of software manuals for Sinclair Research, most notably those for Logo.

The idea of writing the first biography of Sinclair came out of a discussion Dale had with Colin Haycraft, of Duckworth Publishers, in 1983.

"It emerged that Colin had been trying to get Clive's autobiography," Dale explains. "Clive had replied that he was too busy and in any case it would make him feel too old."

When Haycraft discovered that not only had Dale known Sinclair for some time, but would be interested in writing the biography, Sinclair was approached again.

"After much toing and froing Clive agreed that we could proceed. He wouldn't have consented," Dale adds, modestly, "to just anybody writing it."

Sinclair gave Dale several interview sessions and allowed him to rummage through his personal archive box. He granted, too, access to people in the company.

"'Granted' suggests that Clive had the right of veto over the manuscript," says Dale, "and I suppose in a way he did, though we agreed that he could later alter only errors of fact. He has seen the manuscript and hasn't exercised his right to change anything."

And how did Sinclair react to this 'warts and all' account? "Apparently he said, 'It's very accurate. I don't know where he got it all from.' "

Apart from the archives, Dale got it all from 60 hours of interviews with associates and employees of Sinclair. That, and ransacking libraries for back issues of *Practical Wireless*, *Instrument Practice* and other relics of the past. Filing cabinets and cardboard boxes crammed with cuttings line the walls of Dale's office.

The result, *The Sinclair Story*, is about as comprehensive as you could wish. More important, it is very enjoyable to read. Photographs of the beardless Clive, pages from his school exercise books and charmingly ingenuous adverts for his earlier products — 'easily built in a single evening' — help recapture the excitement and naivety of Sinclair's growing pains and the immature computer industry.

It's all there — Sinclair's volatile friendship with Chris Curry, the tragic involvement with the bureaucratic National Enterprise Board, the abortive attempt to win the BBC contract, the arduous development of the ill-conceived C5. Running through it all is Sinclair's obsession with miniature television, on which research first started in 1964.

Omissions are few, though it is surprising that Dale glosses over the beginnings of Sinclair Research and the work which went into the ZX80, especially given his meticulous approach to the development of the pocket calculators and the MK14.

> ***"The danger is that Clive might go on producing computers because he can't produce anything else"***



Dale is taken aback when this is pointed out to him. "Yes, there is quite a jump," he agrees, scribbling a note in the margin. "There's nothing sinister in that . . ."

Although *The Sinclair Story* claims only to be an account of Sinclair's business ventures, here and there we find the man behind the name peeping between the lines. Dale explains, "I asked Clive in an early interview how much he wanted it to be about the business and how much about him. He replied that he didn't want to suddenly appear as if from nowhere, but he did want to remain private. And that's what happened."

As to the future, Dale thinks that the home computer industry is likely to go the same way as the calculator boom of the seventies. "It's been a juggernaut. It's run away and crushed everything in its path.

"It's not an industry which attracts cautious people. Had it been so, perhaps the brakes could have been applied earlier rather than at the edge of the precipice."

Sinclair has been as guilty of that as anybody. "There are people within the company who individually think that caution and circumspection are a good thing, and that this has been overridden by success."

Drawing parallels with Sinclair's dogged determination to continue producing calculators long after the market had died, Dale adds, "The danger is that Clive might go on producing computers because he can't produce anything else."

Sinclair's venture into electric vehicles does not appear to be the answer, though Dale too was fired by Sinclair's enthusiasm over the C5. "One of the most extraordinary moments of my life was realising that there was something wrong at Alexandra Palace," he says, thinking back to that snowy day when the C5 was unveiled. "It suddenly flipped from a brilliant idea which was going to be a vast success to something which was very dangerous."

But, Dale concludes, "The world would be a poorer place without Clive Sinclairs around. They make enormous mistakes but they also make life richer."

*Rodney Dale is author of a disparate volume of work, including a biography of Louis Wain, **The Man Who Drew Cats**; the modern folklore collection, **The Tumour in the Whale**; and **The World of Jazz**. With Ian Williamson he has co-authored **Basic Programming** and **The Myth of the Micro**.*



Clive's earl

CLIVE MARLES Sinclair was born near Richmond in Surrey on 30 July 1940. His father and grandfather were both engineers.

Clive's brother Iain was born in 1943 and his sister Fiona in 1947. The Sinclair children remember a particularly idyllic childhood. Clive came into his own in the holidays, for he loved swimming and boating and at an early age designed a submarine which owed as much to grandfather George's naval interests and Jules Verne as to the availability of government surplus fuel tanks.

Clive found the comparative freedom of holidays a necessary antidote to school; a time when he could pursue his own ideas and teach himself what he really wanted to know. A sensitive child with ways of thought and speech beyond his years, little interest in sports other than aquatic, he sometimes found himself out of joint with his schoolfellows.

He preferred the company of adults, and there were few places other than with his family where he could feel intellectual companionship. To some, the Sinclairs seemed to be unconventional, a family who spoke directly, frankly, and often argumentatively to one another as a matter of course — because not only was it more fun that way, but also, as Clive now says: 'You get more out of people by disagreeing with them.'

Clive went to Box Grove Preparatory School; he recalls it with affection, and was very upset when it was eventually closed. When he was ten, the school reported that it could teach him no more maths, and he moved on to the secondary phase of his education.

At about this time, his father suffered a severe financial setback. With Sinclair tenacity, he started from scratch — still in machine tools — and fought his way back in a remarkably short time. However, fighting one's way back is not without its effects on one's family, and Clive went to a number of schools for his secondary education. Taking his O-levels at Highgate School in 1955, and S-levels — in physics, and pure and applied maths — at St George's College, Weybridge.

Mathematics — that perfect, concise language — had always interested him deeply, and he had barely become a teenager when he designed a calculating machine programmed by punch cards. Because he wanted to make the adding as simple as possible, he did it all with 0s and 1s. 'I thought that was a great idea. I was really amazed to discover that this was a known system; the binary system. That discovery disappointed me deeply; I thought I'd made my fortune . . . but I was very pleased with the idea.'

As a teenager, he also 'discovered' electronics. He had always been fascinated by things miniature, and he carried this interest into his electronic designs, seeking to produce ever more refined and elegant circuits, using smaller and smaller components. The state of his bedroom — a mass of wires — was a family joke, but from it came amplifiers and radios for his family and close friends, and an electrical communications system for their hideouts in the woods.

He worked hard at school, particularly on subjects he was keen on, reading and absorbing far beyond the required level. If he wanted to learn something, he did so very readily; he had — and still has — an incredible facility for assimilating information. The converse is true; at school he had little time for subjects which did not interest him. While still at school he wrote his first article for *Practical Wireless*; it was published; heady stuff.

As an antidote for working hard, Clive and his friends were wont to hold wild teenage parties. A friend of his from a strict Catholic family recalls that one Christmas Eve, after a few drinks, he said to Clive: ' "I'm off to church; I've got to go because I'm in the choir", so Clive said he'd come along with me, and we staggered into the choir stalls and Clive just joined in with his fine bass voice. Not bad for an atheist!'

When he left school just before his eighteenth birthday, there was no

reason why he should not have gone to university — except that he didn't want to. He knew from experience that what he wanted to learn he could find out for himself.

C M Sinclair's Micro Kit Co was formalised in an exercise book dated 19 June 1958 — three weeks before the start of his A-levels. In this book we find a radio circuit, 'Model mark I' with a components list: 'cost/set 9:11d + coloured wire & solder/nuts & bolts + celluloid chassis (drilled) = 9/–'.

He had been delighted to find how cheap components were if bought in

Right: Clive Sinclair at A-level time
Below: Sinclair's early sketches for a radio circuit

plenty of time for further reading and circuit design. *PW* readers could not always get his published designs to work, but a design that didn't work always resulted in a large postbag.

A job which occupies an active mind for a fraction of the time lacks satisfaction. The Silver Jubilee Radio Show opened at Earl's Court at the end of August 1958, and Sinclair was representing *PW*, on Stand 108, selling magazines and subscriptions, and still wondering how to launch his own



rly days

The first of two extracts from Rodney Dale's Sinclair Story

bulk, and that there were such things as call-off rates. He also realised that to sell big you had to look big, even if you weren't. Not for him ninepenny words and five-and-sixpenny lines; he would think in terms of half-page advertisements at the very least.

Half-page advertisements and components by the thousand . . . where was the money to come from? Why not write another article for *Prcctical Wireless*? The article was accepted, although it was not published until the following November — no instant cash there. But then he saw *Practical Wireless* advertising for an editorial assistant; he applied for the job and got it. He told his parents it was a holiday job. After a decent interval, he told them that *Practical Wireless* thought very highly of him and that there were tremendous prospects there — none of which was true.

But as it turned out there *were* tremendous prospects because the magazine was run by an incredibly tiny staff: editor, assistant editor, and editorial assistant — Clive. The editor had to retire through illness and the assistant editor stepped into his shoes. He soon collapsed under the strain, and there was Clive Sinclair, at the age of 18, running *Practical Wireless*. He says that it was not a difficult job; all he had to do was to take the material from the regular contributors, look through the articles which poured in from hopeful amateurs, select enough for a well-balanced magazine, and give them an editorial polish. The day a week that editing *PW* took gave him

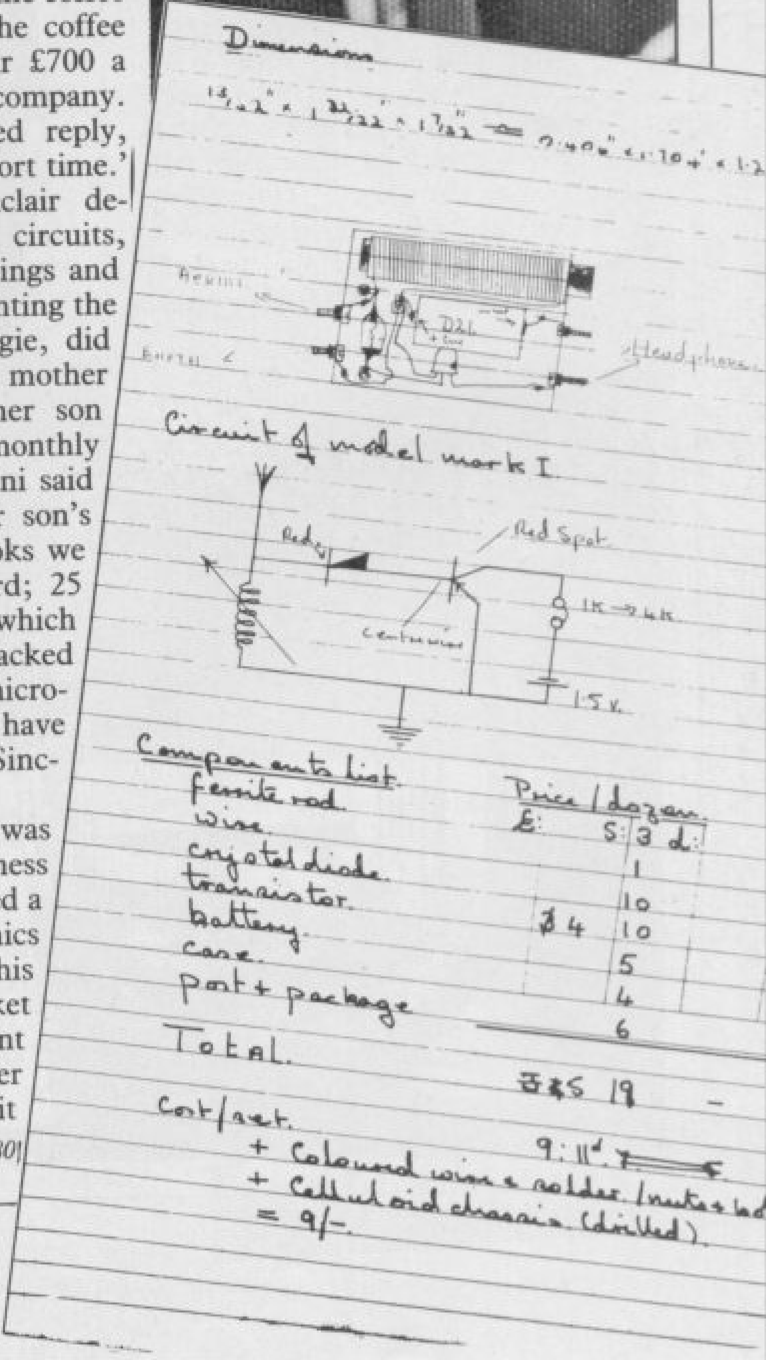
business. Opposite, on Stand 126, was Bernard's Publishing.

Sinclair recalls: 'There I was on the *Practical Wireless* stand, when all of a sudden an immense figure loomed up. It was Bernard Babani; out of the corner of his mouth, best gangster fashion, he said; "See you at the coffee stall in ten minutes."' At the coffee stall, Babani offered Sinclair £700 a year to run his publishing company. 'Maybe,' was the murmered reply, 'but I expect a rise after a short time.'

At Bernard's, Clive Sinclair designed and sometimes built circuits, and Mr Singh did the drawings and prepared the artwork for printing the books. The secretary, Maggie, did everything else. Sinclair's mother had been dubious about her son leaving the security of a monthly magazine but Bernard Babani said to her: 'Mrs Sinclair, your son's name will be on all the books we publish.' Many a true word; 25 years later that storeroom which was Sinclair's office is stacked high with books about microcomputers — and you don't have to look hard for the name 'Sinclair' on the covers.

But his burning ambition was still to start his own business and in 1961 he had registered a company, Sinclair Radionics Ltd, on 25 July. He took his design for a miniature pocket transistor radio and spent some time seeking a backer for its production in kit

continued on page 80



continued from page 79

form. He gave in his notice to Babani, only to find that his backer had developed cold feet.

He needed another job to earn some money — both to live and to finance the business he was determined to start. He had little difficulty in finding one; he joined United Trade Press — based at 9 Gough Square, just off Fleet Street — as technical editor of the journal *Instrument Practice*.

His name first appears in *Instrument Practice* as assistant editor in March 1962. He lost no time getting to work, and 'Transistor DC Chopper Amplifiers' appears in two parts in May and June, followed by 'Silicon Planar Transistors in Hearing Aid Design'.

His last appearance as assistant editor was in April 1963, but the year he had spent marrying UTP to the semiconductor industry was of great mutual benefit. As a journalist he could approach all the semiconductor manufacturers and was welcomed with open arms.

One of the facets of Sinclair's genius lay in his ability to reduce the size of his designs. Although he had a sound grounding in theory, he was also very practical. He knew that manufacturers were selecting components to meet their published specifications, which left them with 'rejects'. These 'rejects' would obviously meet *some* specification; the art was to determine what that specification was. Having done that, he could design circuits in which components would perform perfectly well. Thus did he move from publishing to marketing.

Below: Sinclair Radionics Ltd, 1963
Right: Clive Sinclair in 1978
Lower right: The first Sinclair Radionics ad, 1962

The first intimation that the world had of the existence of Sinclair Radionics Ltd was the half-page advertisement which appeared in the hobby magazines in November 1962. This was for the Sinclair Micro-amplifier, 'the smallest of its type in the world', which 'out-performs amplifiers twenty times as large'. There was a picture of the Micro-amplifier sitting on a halfcrown.

Sinclair set up his research, development and marketing organisation in his office at Gough Square. However, the address given in the advertisements for Sinclair Radionics Ltd was 69 Histon Road, Cambridge; here is some background. In 1958, I started a design and printing company called Polyhedron Services, and two years later had moved to 69 Histon Road and become involved in the development of Cambridge Consultants Ltd. CCL was founded in 1960 by Tim Eiloart, a Cambridge chemical engineer.

When CCL wanted to set up a workshop, I let them the disused bakehouse at 69 Histon Road. By this time, Tim Eiloart had met Clive Sinclair; Clive had just set up Sinclair Radionics and needed an organisation to receive his mail, assemble sets of components into kits, and despatch them. It wasn't quite the high-tech work which CCL had envisaged but no matter; as the Sinclair advertisements appeared CCL was ready with the servicing organisation.



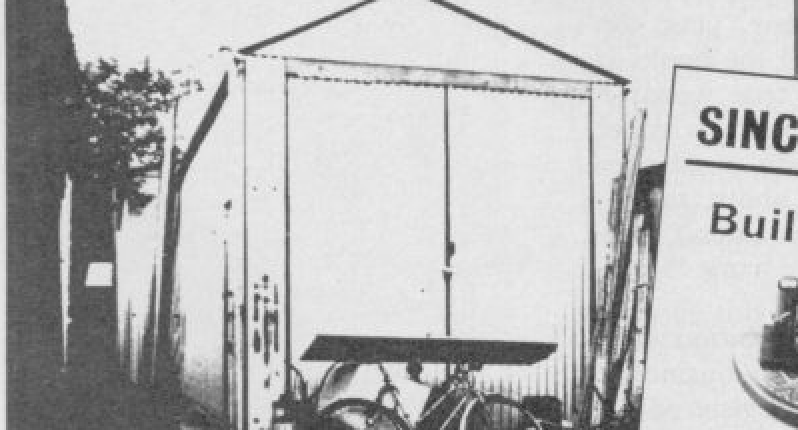
The half page Micro-amplifier advertisement was repeated in December 1962; and in January was expanded to a full page. Not knowing what was going on, I was somewhat surprised when we were asked to print a second batch of 1000 data sheets. The idea of 'stack it high and sell it cheap' by mail order was one with which we at Cambridge Consultants and Polyhedron were unfamiliar. 'He's either going to become a millionaire or go broke' we muttered to one another as piles of mail mounted.

The next thing we knew at Polyhedron was a request for 1000 cards regretting that, owing to an unprecedented demand, there might be some delay in despatching your Sinclair Slimline. This radio, the dream on which the original Sinclair Micro-Kit Co had been built, was announced in February 1963.

Sales were going from strength to strength; ideas for products were coming thick and fast. The CCL workshop was burgeoning, and the upper floor of the bakehouse was becoming somewhat overcrowded.

● ***The Sinclair Story**, by Rodney Dale, is published by Duckworth and is available from all good bookshops. If you have difficulty in finding it, contact the publishers, Duckworth Ltd, The Old Piano Factory, 43 Gloucester Cresent, London NW1. Price £9.95 inc p&p. Visa and Access accepted.*

Next month: The ZX80 and beyond







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BING CROSBY hisses. Rain water drips from a damp patch above the bay window.

Painted eggs, miniature elephants and celtic jewellery crowd the table tops and the heavy Victorian mantlepiece. Framed pictures of girls brandishing hockey sticks are propped behind a stack of classroom slates. The phonograph winds down, Bing crackles to a finish, and the hiss fills the room.

The five of us – a motley deputation from the computer press – are in the tea room at St Bride's, a white crumbling turn-of-the-century house overlooking the tiny fishing village of Burtonport, in County Donegal. Mists roll in across the rocky coastline and the moors stretch behind, dotted with scraggy sheep and thatched cottages deep in peat.

The tea room is dark and a bit damp. There is something else about it, not perceived at first. There is no electric light, no light switch, no sockets.

The 1980s slip away . . .

St Bride's is a school for young ladies between the ages of 13 and 18. Here are some lines from its prospectus: "The girls receive the healthy benefit of lively sea air and fresh open countryside, and in the matter of sunshine, so vital to the health of growing children, we are singularly well favoured.

"St Bride's offers a standard classical curriculum, the cardinal subjects being Mathematics, Elementary Latin, Grammar and Literature . . . The day begins with the rising bell at half-past seven . . . The School has a modern gramophone which may sometimes be used by an unsupervised group of girls, providing that great care is taken to avoid overwinding."

St Bride's is a surreal holiday where grown-up women relive their childhood fantasies by dressing up in pinafores and bonnets and going back in time to a '20s boarding school.

St Bride's is a young software house whose first game was, appropriately, **The Secret of St Bride's.**

St Bride's is . . .

Marianne Scarlett and Priscilla Langbridge, the Games Mistresses of St Bride's, are very much larger than life, a phrase they often use to describe themselves. Flamboyant in wide-brimmed bonnets and matching two-pieces, they are impressively dramatic. Those are their real names, though not the names they were born with, for, as Priscilla explains, "one's real name is the name you are using at the time".

Marianne is also headmistress of the school. On the back of the prospectus she is billed as Miss Brighe Dachcolwyn, another real name. As she pours the coffee — or possibly tea, none of us are sure, but it is undrinkable — she travels back in time to the hazy beginnings of the school.

"Partly it was 'what we do with this big house?' " — she waves her hands expansively — "and partly my background in humanistic psychology, the right sort of background for an unusual idea. I did know about the unhappiness of the modern person. I felt what was missing was some of the feelings from old-fashioned books — that you could trust people, that they would support you — good, old-fashioned upright ideas . . .

"We wanted to give people the experience of being teenagers again. One of the ways to create that effect was a school environment in an unfamiliar time — an imaginary '20s or '30s."

The school was advertised widely, in the *Observer*, the *Sunday Times*, *Girl About Town*, and in the theatre programme for *Daisy Pulls it Off*. News also got around by word of mouth.

The girls who attend are aged between 20 and 30 — "Nurses, teachers, office workers, people who are interested in seeing the psychological effect take place on themselves." The absence of electric power, and the garishly painted dormitories, reinforce the effect.

About 80 attended this season, a maximum of eight a week, and while most are from England, some have come from America and Sweden. Those who would have difficulty fitting in tend to weed themselves out before they arrive. They take lessons, go out on nature rambles, buy tea in the tea room with old money. The role-playing continues 24 hours a day: "There is a strong atmosphere even when the staff are not present. People come for the experience but accidentally sharpen their wits. They also discover about friendship — it's very heartwarming."

Do they enjoy any schoolgirl adventures? Marianne's eyes twinkle under the swathes of violent eyeshadow, "Three or four girls might go out and rather excitingly get cut off by the tide."

Well, it's not so different from grown-up boys hitting each other with cardboard axes at Treasure Trap Castle, but how do the Burtonport villagers take to life at St Bride's?

"We get on very well with the locals. We print the labels for the fishermen's co-operative and do the posters for the horse races. Irish people don't think the same as the English, they love people making a splash. They have a phrase, 'to have a bit of crack' which means you're up there at the top.

"I'm considered the best dressed woman in Burtonport."

The second best dressed woman in Burtonport has been quiet so far, demurely fanning herself with a white fan. Previously a freelance writer, Priscilla first came to St Bride's as a pupil. She brought with her a second-hand Commodore 64, and somewhere found a socket to plug it into. Marianne was a bit taken aback at this intrusion of the modern world into the real world of St Bride's but they played a few arcade games and, as Priscilla adds, "we discovered that she had this penchant for blasting things."

"I didn't have any experience of computers," explains Marianne. "My experience was in thinking backwards. But I found they were wonderful, they were magical." She laughs. "I'm a great fan of racing car games."

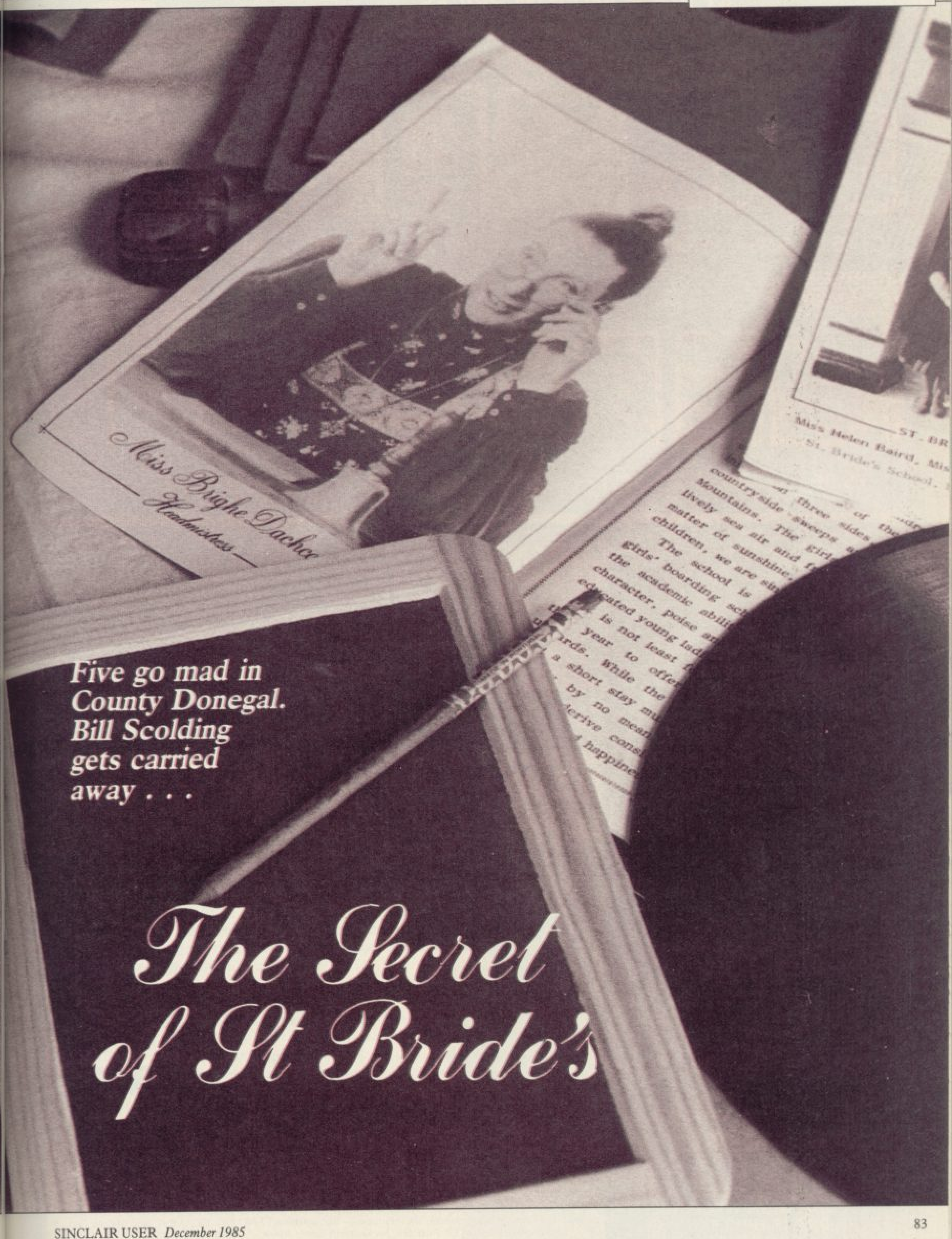
Their first game, **The Secret of St Bride's**, grew out of the mystery games which the girls played on their afternoon rambles. The aim was to notice odd things which they passed, pretend that those were clues and work out the mysterious connections between them.

The game was started on the C64, using **Quill**, and finished on the Spectrum when Priscilla discovered the delights of the 48K wonder.

The cover of the early version depicted Marianne in fine cane-wielding form, but on the inside appeared a barely-clad Amazon. The copy, too, was ever so slightly teasing: "You are Trixie Trinian . . . You've come to St Bride's for a school holiday, but things aren't quite the way you expected — in fact they're very strange indeed! Explore the classrooms and the dormitories to find the school's dark secret."

Our very own Richard Price awarded the adventure five stars, and

continued on page 85



The Secret of St Bride's

Five go mad in County Donegal. Bill Scolding gets carried away . . .

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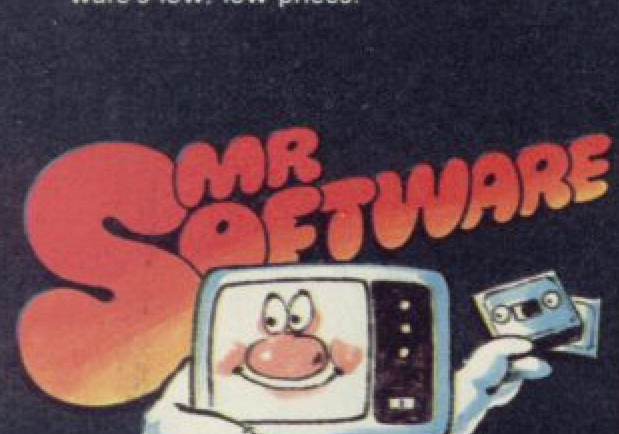
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sales to date total a couple of hundred mail order. But now a deal has been struck with Audiogenic, which is taking over the packaging, duplication, distribution and advertising, though the Games Mistresses are continuing with their suggestive press releases, featuring their peculiar and appealing sense of humour. Apparently, Priscilla is always drunk when she writes them, which explains a lot.

Plans are afoot, and well-advanced too, for many more games. One for release soon is **Unexpurgated Caves.** As Priscilla explains, it is a tribute to the original Crowther-Woods mainframe adventure, **Colossal Caves.** The press teaser reads: ". . . even before Crowther-Woods there was a very early proto-caves original. Nobody could produce a version of it, or even mention it except under severe penalties. We can now reveal the reason for this extraordinary embargo: the original game was considered TOO SILLY to bring before the public. It made Monty Python look like *War and Peace*."

Priscilla waxes lyrical. "I like the economy of it. I like the two-word input, the over-use of 'get' and 'drop'. It's useful to have a very simple command structure which can be used inventively. People make a fetish of over-sophistication."

Nearly out is **The Snow Queen**, the first of St Bride's Living Books, previewed in November's *Sinclair User*. The idea is for the program to be packaged with a facsimile edition of the original book. Others in the series include **Raffles** and **Alice.**

Much more ambitious are the software/comic tie-ins, **Wondergirl** and **Silverwolf**, each scheduled for the new year and each packaged with a comic. Priscilla has an enviable knowledge of the more obscure comic strips, and has endulged in some cheerful piss-taking. **Wondergirl** begins with the prediction by Professor Jorrell of the planet's imminent destruction. His daughter is despatched by rocket, and on its path it passes through the obligatory asteroid belt, imbueing the child with superpowers. Unfortunately, Jorrell is wrong, the planet is saved, and Wondergirl returns to champion truth, justice and the Irish way from her base in the home counties.

Silverwolf appears to be more serious. Priscilla passes round some roughs for the strip artwork, and we scrutinise some frames which wouldn't appear in **Bunty.**

Both programs might need an entirely new system for writing adventures. "We're working on it," as Priscilla says. 'We' is a programming team of two, Priscilla and the elusive Maureen, but possible expansion might encompass "a machine code programming chap in Sligo".

Both the Games Mistresses deny that their software is particularly aimed at the female market, although Marianne says that they would like it to appeal to women. "Perhaps girls are embarrassed about playing zapping games . . ."

We leave the tea room for a conducted tour of the school, Marianne's gestures growing ever more sweeping as she shows us the ancient desks with their inkwells, the dormitories of matching candlewick bedspreads, the panelled walls, the stained paintwork . . . "The plaster was mixed with sea salt, which grows crystals which expand and contract with the tides and the strength of the moon." We are treated to a privileged sight of the new telephone, replacing the old wind-up version which made communicating with St Bride's such an amusing pastime.

Marianne entertains us with stories of the house's history, of IRA gunmen in the '20s hiding out in false crockery cupboards, dressing up as women to escape the soldiers. Back in the tea room, she is effusive. "I don't like the modern world, and I don't live in it. I'm not a modern person . . . I don't act, I just do it."

As we drive off, we look back at them, two figures in a landscape, part of it and apart from it, holding their bonnets against the buffeting wind.

Epilogue

Days later, when I'm writing this article, I find the real world of St Bride's – its dark rooms, its waxing and waning walls – beginning to fade. Neon lights the office, telephones ring, typewriters buzz, graphics flicker on TV screens. Everywhere is Electricity.

I decide to try out St Bride's new STD number. In a matter of hours I'm speaking once more to the Games Mistresses, who've just returned from the pub — I have this mental picture of Marianne and Priscilla, hats and all, carousing with Irish fishermen, their fists full of Guinness.

I try to convey how incredible the visit now appears, how it has taken on the feel of a theatrical performance.

Marianne: "There's much less of what people think of as real life and much more fantasy in every waking moment in this house."

What *is* the secret of St Bride's?

Priscilla (long silence): I suppose . . . to rub out the lines between fantasy and real life."

Yes.



Marianne winds up Bing Crosby

Speed trials

Marcus Jeffery compares contenders in the battle of the Spectrum compilers

SINCE OUR recent review of the **Blast** Basic compiler for the Spectrum, two new compilers have hit the market.

The first is known as **The Colt**, from Hisoft, and was written by the author of the two compilers **Mcoder I** and **Mcoder II**, which were previously released by PSS. Meanwhile PSS has brought out a different compiler, thought to be a French product, which it has confusingly called **Mcoder III**.

We decided to put both those new releases up against **Blast**, which has been receiving some bad publicity of late, to see how they fared.

The Colt is a fast integer only compiler, and speed-wise came out as the best of the three. That is not surprising when you consider that apart from BEEP, CIRCLE and DRAW statements, it can only use integer arithmetic — integer numbers in the range −32768 to 32767. That isn't quite true, because you can still access floating point arithmetic via VAL and STR$ statements, but those can't really be used effectively.

In addition to being integer only, there are quite a few other Spectrum commands which **The Colt** cannot handle. Those include multi-dimensional arrays — making the use of string arrays particularly difficult, CLEAR to lower RAMTOP for machine code or data, and user-defined functions.

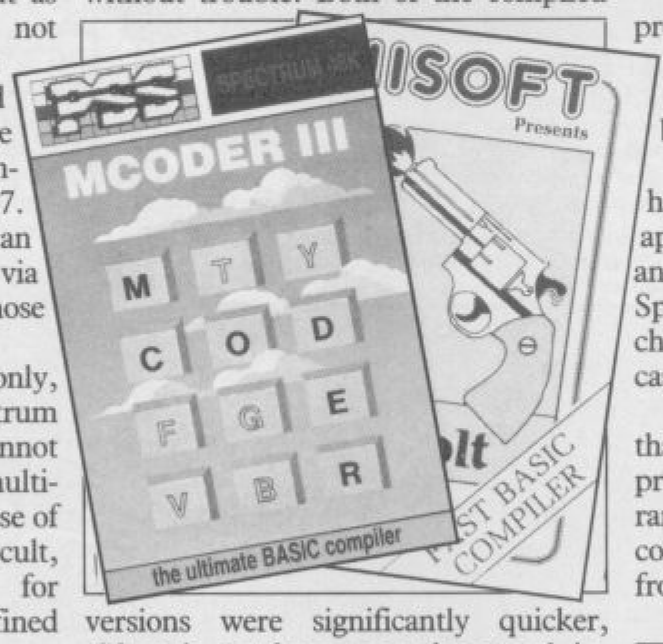
On the other hand, **The Colt** does include a fair selection of extras, which enhance not only compiled code, but also interpreted Spectrum Basic. Those are all part of a suite of routines known collectively as the Executive which sits at the top of memory until the user needs the space, and removes it.

The Executive allows a whole multitude of new commands, including sprite graphics, windowing with scrolling and colour commands, keyboard scanning, machine code parameter passing, error handling, a trace facility and a multi-line delete.

Moving on, **Mcoder III** from PSS is more in a line with the **Blast** compiler, being able to handle most Spectrum Basic, including floating point arithmetic. There are a few commands which **Mcoder III** can't cope with. Those include redimensioned arrays, or arrays which are dimensioned with a variable, rather than a constant.

It's all very well telling you that one compiler will compile something, whilst another compiler won't, but that doesn't help you decide which to buy. We decided to test them all out using your own programs. In the Program Printout section of this issue are three programs: **Body Blow**, **Power Paint** and **King Fisher**. How did the compilers fare with these?

King Fisher was found to be by far the easiest, and both **Blast** and **Mcoder III** were able to compile the program without trouble. Both of the compiled versions were significantly quicker, although nowhere near the speed increases you are likely to see the publishers claiming. The failure in this case, after a valiant effort, was **The Colt**.



The Colt was also the only failure with **Body Blow**. This software again showed some improvement in speed with **Blast** and **Mcoder III**, but was limited by the high rate of user input necessary in this particular program.

Finally, both **The Colt** and **Mcoder III** failed abysmally with the drawing package, **Power Paint**. **The Colt** threw up errors — non-compilable code — all over the place, reaching the point where the program needed rewriting to compile it. **Mcoder III**, on the other hand, completed its syntax check without error, then stopped whilst trying to compile the code, on a line which PEEKed from screen memory.

On a more successful note, **Blast** handled the compilation perfectly, and significantly improved the program speed, though again, not by as much as Oxford Computer Systems would have you believe.

As well as those three programs, we tested the compilers on a range of additional programs designed to test their speed, rather than Spectrum BASIC compatibility. In those tests, **The Colt** really came into its own.

The Colt was able to give an average speed increase of approximately 17 times faster than Basic, whilst **Mcoder III** and **Blast** gave a factor of around 12 times normal speed.

PPS' **Mcoder III** was marginally faster than **Blast** in the trials, but **Blast** was being used in its default p-code mode. That gives a compact sub-code, which is then interpreted into Z80 machine code. If space was no problem, then setting machine code mode would probably improve the speed factor further.

If you are intending to write your own programs from scratch, fitting into less than 30K, and not needing floating point arithmetic, then **The Colt** must be highly recommended.

Both **Blast** and **Mcoder III** can handle floating point arithmetic, appear to give similar speed increases, and are able to handle the majority of Spectrum Basic. **Mcoder III** is a lot cheaper, and would be recommended to cassette users.

Finally, **Blast**, although much dearer than its rivals, emerges as a superior product. Having tried it out on a wide range of programs, it was able to compile them all, including the failure from the previous review.

Blast Basic Compiler
Publisher Oxford Computer Systems, Hensington Road, Woodstock, Oxford OX7 1JR.
Tel: 0993-812700
Price £24.95
★★★★★

Mcoder III
Publisher PSS, 452 Stoney Stanton Road, Coventry CV6 5DG.
Tel: 0203-667556
Price £12.95
★★★★

The Colt
Publisher Hisoft, 180 High Street North, Dunstable, Bedfordshire LU6 1AT.
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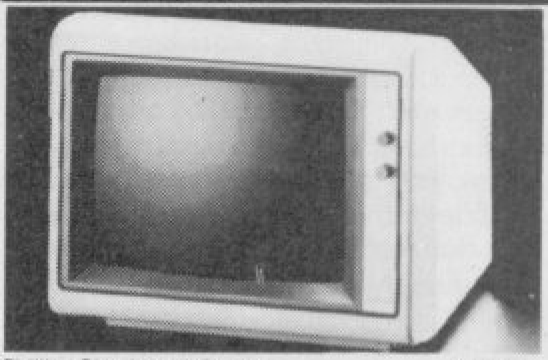
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Integrated Accounts

HAVING already released **QL Cash Trader,** an accounting package for businesses, Sinclair Research has followed up with **Integrated Accounts.** Written by Sagesoft it is a full accounting system containing sales, purchase and nominal ledgers and a wide range of reports.

The packaging is the standard black case and ring binder manual, holding four microdrive cartridges. Those contain the utilities, postings and reports programs with a spare cartridge for data. The programs are loaded from drive 1 using the "crun" command. The data cartridge stays in drive 2 throughout. With all 80 characters used for the ledgers and reports a television is not really adequate for displaying the results.

The utilities cartridge allows you to set the system to your requirements. Those include the layout of the profit and loss and balance sheets, setting of account codes, tax and printer codes. Up to 50 tax codes can be set but UK users are advised to use the 10 coded T0-T9.

The data cartridges will frequently — at least once a month — become full of data, and more space can be created with the reconfiguration routine which removes all transactions paid in full. Setting up **Integrated Accounts** is time consuming and expert advice should be sought on the allocation of the account codes.

The postings cartridge is used to enter and keep details of the individual transactions involved in your business. That covers the sales, purchase and nominal ledgers. The data entered consists of a shortened account name of up to six characters, the date, a reference, the nominal account code, the details, the net amount and the tax code. The tax is calculated automatically from the net amount but can be overridden simply by typing in the invoiced amount.

Up to 10 transactions can be entered at a time before they are posted. That gives plenty of time to check details and correct any errors which may have crept in. Once the posting has been done errors can be corrected only in true book-keeping style by making an extra, or journal, entry.

One disadvantage is that you are going to need to keep a printed list of nominal accounts, and their codes, handy for making the entries. That is less than ideal but at least the account name is shown at the top of the screen when a code is entered. One improvement might have been a scrolling feature, similar to that used in **Home Finance,** to allow an inappropriate code to be easily changed.

The most important part of any accounting system is the amount of information which can be extracted from it. **Integrated Accounts** provides a wide range of reports, ranging from details of every transaction on a ledger, through individual account statements, to trading profit and loss accounts and balance sheet. The account statements are printed with the customer's remittance advice note on the right-hand side of the sheet. To make the best use of that you need preprinted, perforated stationery. Most of the reports can be either displayed on the screen or printed.

The manual offers a relatively trouble-free entry into installing the package and using the ledgers, though perhaps it needs more detail in the advice on setting the nominal account codes.

The manual not only stresses the importance of making regular back-up copies of your data — and illustrates how that should be done — but also of

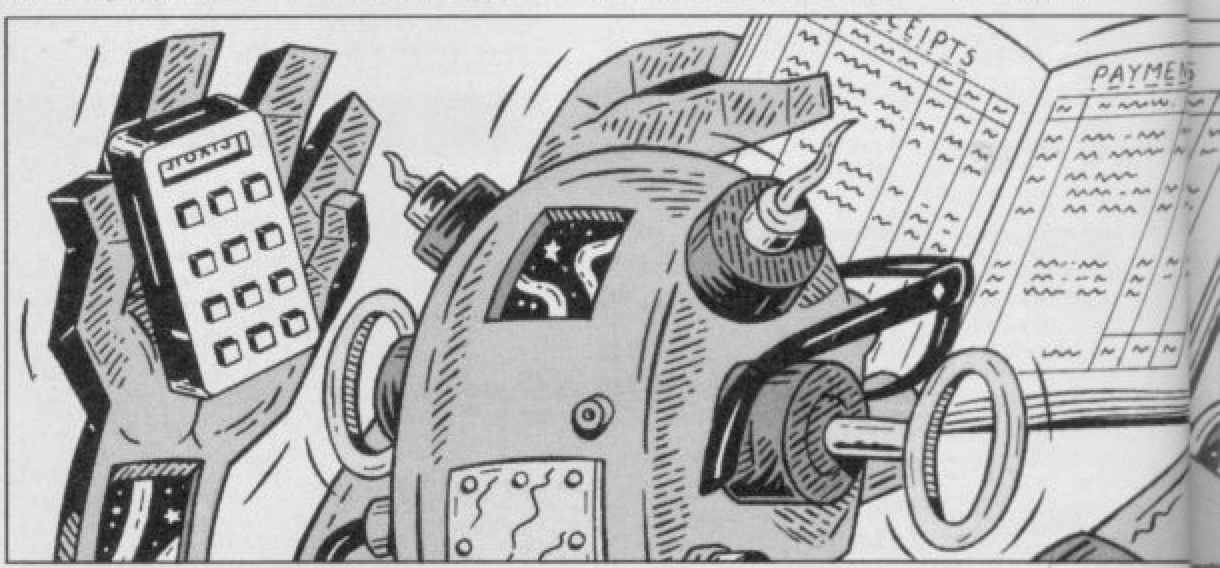


Illustration: Stephen Wright

Micro Office

MICRO OFFICE from SD Micro-Systems is a four program package designed for the small businessman. It contains sales and purchase ledgers, mailing list and stock control. It is supplied on microdrive for use on the 48K Spectrum, microdrive and full-sized printer. A cassette version for use with ZX-type printers is also available.

A master menu is used to link the four programs and allow any one of them to be loaded easily. It also provides facilities for opening the printer channel and setting up the microdrive utilities.

The operation of the sales and purchase ledgers is identical. Entries can be made as cash transactions, credit transactions or payments. The transactions require the date, account name, amount, details (which could be the invoice or order number), whether VAT-rated and a category.

Only 10 characters are allowed for the account name and only six for the details, while the payments section requires only the date, account and details. An attempt is then made to reconcile the payment with an existing credit transaction. If a match is found it is automatically changed to a cash transaction. If your business accepts part payment then you will probably need to look elsewhere for your ledger programs.

The date is entered as four digits — ddmm. There is no error trapping on that and even alphanumeric entries are accepted as valid. Allowance is made for a single VAT rate only. That will be satisfactory for many but not if you require several categories.

Having entered the data you will require some reports. Those can be generated to show the amounts received and owing, the individual amounts owing by account and details, a summary of VAT charged, an analysis of amounts owed by account showing the amount as a percentage of the total owed, or a full list of all transactions.

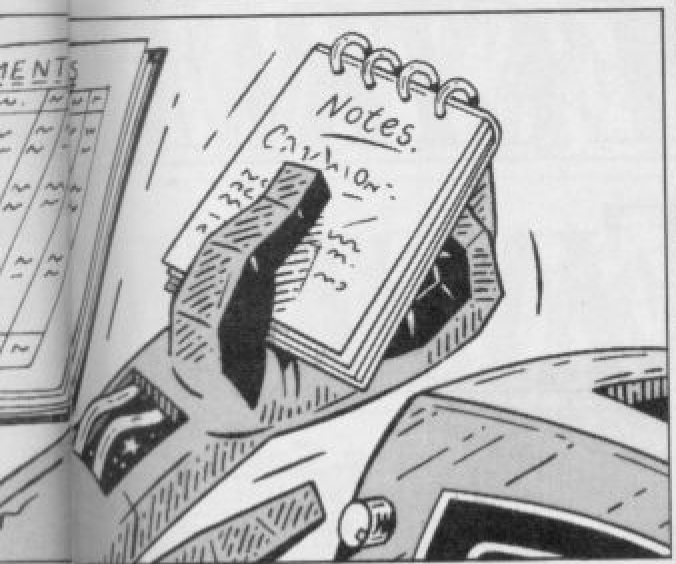
following good book-keeping procedures in filing invoices and recording payments and receipts.

One of the problems always encountered with business software is the level of support available. Sagesoft offers a year-long maintenance agreement for £40.25. That provides a telephone hot-line for queries, free updates, utility routines and notification of changes necessitated by Government legislation.

Once set up **Integrated Accounts** becomes the sort of package which managers are seeking. It is easy to use with a comprehensive reporting system. In terms of value for money it will be difficult to beat, and with the reduced price of the QL many managers will now be able to think in terms of a dedicated system, costing less than comparable software for a 'real' business machine.

Mike Wright

Publisher Sinclair Research
Price £89.50
★★★★★



Archiver

QL ARCHIVE is a powerful and flexible database and like all such programs requires a fair degree of programming expertise to achieve satisfactory results. **Archiver** from Eidersoft is a package of four **Archive** routines for invoicing, stock control, appointments diary and mailing list.

Although the routines are ready to use, it is Eidersoft's stated intention that users should be able to adapt the routines to suit their particular circumstances. To that end, approximately two thirds of the manual consists of explanations of the various procedures and variables which form the routines.

Each routine is intended to create its own database of program and data cartridges. **Archive** must be loaded first before the program cartridge is placed in drive 2 and the data cartridge in drive 1. I found using three cartridges irritating and, after some juggling, found it possible to fit **Archive** and the program onto one cartridge.

The four programs use a similar system of menus and prompts. Every option is selected by a single keystroke making selection easy.

The most complex function, invoicing, is also the most poorly documented for instant use. The VAT rate is set initially and cannot be changed for different items on one invoice. It can be changed from invoice to invoice. Names of items can be entered manually or taken from a stock control data file.

Stock control provides a very flexible method of keeping details of your stock. Data for any item consists of a stock number, description, short name, number in stock, re-order level and quantity, price — inclusive and exclusive of VAT. In addition, up to five trade prices, location, postage and packing details can be kept. All the usual features are included for adding, withdrawing or checking stock. A powerful search option allows you to search for the number, description or short name.

Up to 32 appointments a day, at 15 minute intervals, for up to 60 days ahead can be kept on the appointments program.

The mailing list program used to print labels is ideally suited to clubs. The labels are printed in one column and can be printed individually by surname or as a group of lables, sorted by town, county, country or subscription level. A nice touch allows all labels printed in a day to be listed for checking. Since my review copy arrived, a mailmerge feature has been added allowing letters from **Quill** to be topped and tailed.

The documentation on using the programs is weak in all cases, whereas the documentation on the procedures and variables is excellent.

These are not the most professional programs available for the QL, nor are they meant to be. What they do provide is a sound basis for you to develop for your own needs. *Mike Wright*

Publisher Eidersoft, The Office, Hall Farm, North Ockenden, Upminster, Essex RM14 3QH **Price** £16.95
★★★★

The mailing list can record up to 200 names, addresses, telephone numbers and other information. A maximum of 20 characters is allowed for the name which is entered as JONES, MR A rather than MR A JONES.

Often you will not want to mail to the whole list but to a part of it only. A sort code allows each record to be assigned for up to five separate groups. The records can be entered in any order and then sorted into alphabetic order. After a sort the records are numbered differently, making them more difficult to find for changing or deleting, unless they are listed first to find the number.

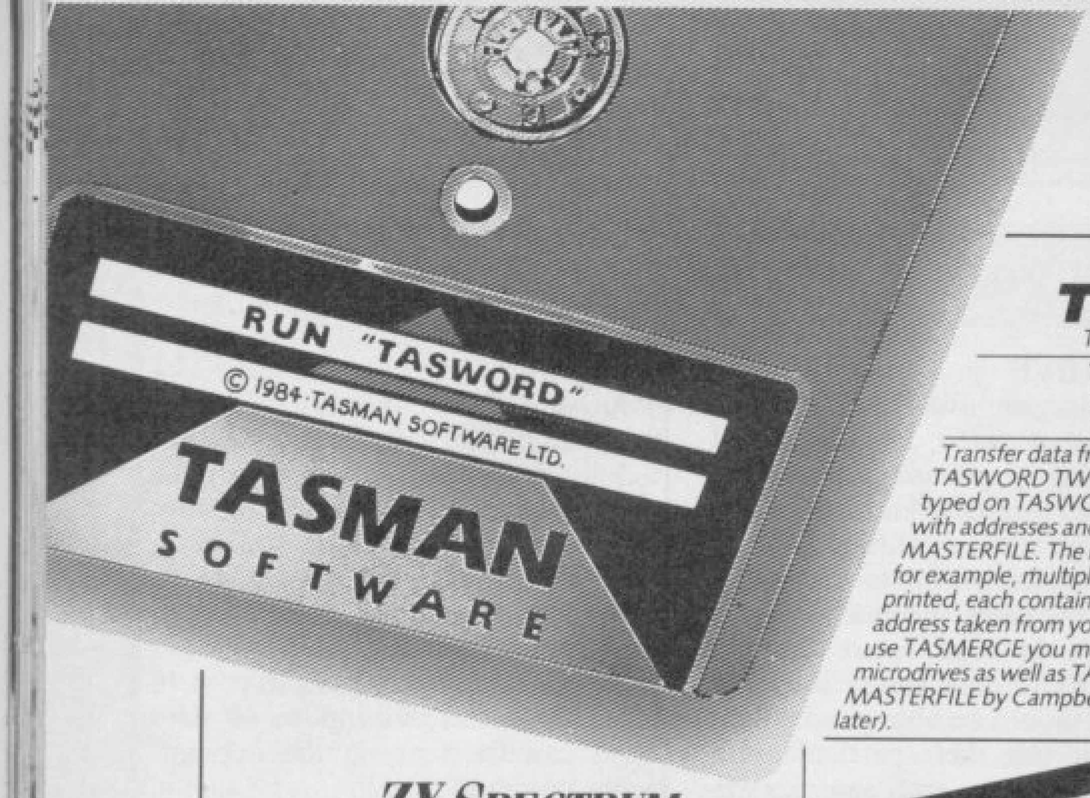
The lists can be printed, either to the screen or printer, as labels — without the telephone number, comment or sort codes. That extra information can be found by listing individual records.

The stock control program is probably the most limited of the four, in that it allows a maximum of only 10 stock lines. The information on each line includes an eight-character reference, 15 characters of detail, five characters for the unit quantity, six characters each for the actual and re-order levels and purchase and resale values, and two sort codes.

Entries can be changed, listed or deleted by their stock number. The listing option is also used for updating details as stock is added or removed. Alternatively all lines with the reference, quantity and levels, or a re-order list, can be displayed or printed. When stock is added or removed there is no option for it to be at a different price. The price can only be changed from the change option.

One unusual feature of all the programs is the option to use the ZX Network to transfer data between Spectrums. If the programs had been more powerful then that might well have been an attractive feature. They are not, and it seems unlikely that it would be used a great deal. *Mike Wright*

Publisher SD MICRO Systems, PO Box 24, Hitchin, Hertfordshire
Price £14.95
★★★



TASMERGE
THE MAIL MERGER

TASMERGE for the ZX 48K Spectrum cassette £10.90

Transfer data from MASTERFILE to TASWORD TWO! Letters and forms typed on TASWORD TWO can be printed with addresses and data taken from MASTERFILE. The mail merge facility allows, for example, multiple copies of a letter to be printed, each containing a different name and address taken from your MASTERFILE data. To use TASMERGE you must have one or more microdrives as well as TASWORD TWO and MASTERFILE by Campbell Systems (version 9 or later).

TASWIDE
THE SCREEN STRETCHER

TASWIDE for the ZX 48K Spectrum cassette £5.50

With this machine code utility you can write your own Basic programs that will, with normal PRINT statements, print onto the screen in the compact lettering used by TASWORD TWO. With TASWIDE you can double the information shown on the screen

AMSTRAD CPC 464–664–6128

With the exception of TASWORD 6128 all the programs described below run on all of the 464, the 664, and the 6128.

TASWORD 464
THE WORD PROCESSOR

TASWORD 464 for the Amstrad CPC 464, 664, and 6128 cassette £19.95

"There is no better justification for buying a 464 than this program"
POPULAR COMPUTING WEEKLY NOVEMBER 1984

ZX SPECTRUM

TASWORD TWO
THE WORD PROCESSOR

TASWORD TWO for the ZX 48K Spectrum cassette £13.90 microdrive cartridge £15.40

"Without doubt the best utility I have reviewed for the Spectrum"
HOME COMPUTING WEEKLY APRIL 1984
"If you have been looking for a word processor, then look no further" CRASH JUNE 1984
With 64 characters per line on the screen and a host of useful features TASWORD TWO is the ideal word processing package for the Spectrum owner.



TASPRINT
THE STYLE WRITER

TASPRINT for the ZX 48K Spectrum cassette £9.90 microdrive cartridge £11.40

A must for dot matrix printer owners! Print your program output and listings in a choice of five impressive print styles. TASPRINT utilises the graphics capabilities of dot matrix printers to form, with a double pass of the printhead, output in a range of five fonts varying from the futuristic Data-Run to the hand writing simulation of Palace Script. A TASPRINT gives your output originality and style! The TASPRINT fonts are shown below together with a list of compatible printers.

TASMAN PRINTER
INTERFACE

TASPRINT PRINTER INTERFACE for the ZX Spectrum £39.90
RS232 Cable for ZX Interface 1 £14.50

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable and driving software. The user changeable interface software makes it easy to send control codes to your printer using the method so successfully pioneered with TASWORD TWO. The cassette contains fast machine code high resolution full width SCREEN COPY SOFTWARE for Epson, Mannesmann Tally, Shinwa, Star, Tandy Colour Graphic (in colour!) printers. TASCOPY shaded screen copy software for this interface (value £9.90) is INCLUDED in this package.

The TASCOPIES and TASPRINTS drive all Epson compatible eight pin dot-matrix printers e.g.

AMSTRAD DMP 2000	NEC PC-80238-N	BROTHER M1009
EPSON FX-80	MANNESMANN TALLY MT-80	BROTHER HR5
EPSON RX-80	STAR DMP501/515/5610	SHINWA CP-80
EPSON MX-80 TYPE III	COSMOS-80	DATAC PANTHER
		DATAC PANTHER II

COMPACTA - bold and heavy, good for emphasis
DATA-RUN - A FUTURISTIC SCRIPT
LECTURA LIGHT - clean and pleasing to read
MEDIAN - a serious business-like script
PALACE SCRIPT - a distinctive flowing font

TASPRINT output shown at less than half size

ZX SPECTRUM
MSX·EINSTEIN

TASCOPY
THE SCREEN COPIER

TASCOPY for the ZX Spectrum with Interface 1 cassette £9.90 microdrive cartridge £11.40

The Spectrum TASCOPY is for use with the RS232 output on ZX Interface 1. It produces both monochrome (in a choice of two sizes) and large copies in which the different screen colours are printed as different shades. With TASCOPY you can keep a permanent and impressive record of your screen pictures and diagrams. A list of printers supported by TASCOPY is given to the left.

TAS-DIARY
THE ELECTRONIC DIARY

TAS-DIARY for the ZX 48K Spectrum and microdrives. Cassette £9.90

Keep an electronic day-to-day diary on microdrive! TAS-DIARY includes a clock, calender, and a separate screen display for every day of the year. Invaluable for reminders, appointments, and for keeping a record of your day. The data for each month is stored as a separate mirodrive file so that your data for a year is only constrained by the microdrive capacity. TAS-DIARY will work for this year, next year, and every year up to 2100! Supplied on cassette for automatic transfer to microdrive.

TAS-SPELL
THE SPELLING CHECKER

TAS-SPELL for the Amstrad CPC 464 and 664 running TASWORD 464-D and for the CPC 6128 running TASWORD 6128 disc £16.50

TAS-SPELL checks the spelling of TASWORD 464-D and TASWORD 6128 text files. TAS-SPELL has a dictionary of well over twenty thousand words which are compared with the words in your text file. You can add your own specialised words to the TAS-SPELL dictionary. Please note that TAS-SPELL will only work with TASWORD 464-D and TASWORD 6128.

Available from goo

TAS
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Springfield House, Hyde Terrac

TASWORD 464-D
THE WORD PROCESSOR

TASWORD 464-D for the Amstrad CPC 464, 664, and 6128
disc £24.95

This is the new TASWORD especially developed to utilise the capabilities of the Amstrad disc drives. A major new feature is a powerful mail merge facility. TASWORD 464-D will only run on, and is only supplied on, disc.

TASWORD 6128
THE WORD PROCESSOR

TASWORD 6128 for the Amstrad CPC 6128
disc £24.95

TASWORD 6128 utilises the additional 64K of memory in the CPC 6128. This gives text files that are over 60K long. TASWORD 6128 includes mail merge and all the other features of TASWORD 464-D. With a new notepad mode and other additional capabilities TASWORD 6128 is the most powerful of the TASWORDS.



TASPRINT 464
THE STYLE WRITER

TASPRINT 464 for the Amstrad CPC 464, 664, & 6128
cassette £9.90 disc £12.90

Can be used to print AMSWORD and TASWORD text files in addition to output from your own Basic programs. Drives the Amstrad DMP-1 in addition to the printers listed on the opposite page.

PRINTER CABLE FOR AMSTRAD CPC 464, 664, and 6128 £9.90

COMMODORE 64

TASWORD 64
THE WORD PROCESSOR

TASWORD 64 for the Commodore 64
cassette £17.95 disc £19.95

Many Commodore 64 owners have asked for this product which is now available. All the well known TASWORD features plus eighty characters per line on the screen! This is the only word processor for the Commodore 64 giving eighty characters per line on the screen – so that "what you see is what you get" on eighty column printers.

TASPRINT EINSTEIN
THE STYLE WRITER

TASPRINT EINSTEIN for the Tatung Einstein
disc £14.95

Print TASWORD EINSTEIN text files in one or more of the TASPRINT fonts.

SINCLAIR QL

QL is a trademark of Sinclair Research Ltd

TASCOPY QL
THE SCREEN COPIER

TASCOPY QL for the Sinclair QL microdrive cartridge £12.90

TASCOPY QL adds new commands to QL Superbasic. Execute these commands to print a shaded copy of the screen. Print the entire screen or just a specified window. TASCOPY QL also produces large "poster size" screen copies on more than one sheet of paper which can be cut and joined to make the poster.

TASPRINT QL
THE STYLE WRITER

TASPRINT QL for the Sinclair QL microdrive cartridge £19.95

TASPRINT QL includes a screen editor used to modify files created by other programs, such as QUILL, or by the user from Basic. These modified files include TASPRINT control characters and may be printed, using TASPRINT, in one or more of the unique TASPRINT fonts.

AMSTRAD · QL
· COMMODORE

TASCOPY 464
THE SCREEN COPIER

TASCOPY 464 for the Amstrad CPC 464, 664, and 6128
cassette £9.90 disc £12.90

Adds two new Basic commands to give both a standard shaded screen copy as well as a "poster size" copy which is printed onto two or four sheets which can be cut and joined to make the poster. Drives the Amstrad DMP-1 in addition to the printers listed on the opposite page.

TATUNG EINSTEIN

TASWORD EINSTEIN
THE WORD PROCESSOR

TASWORD EINSTEIN for the Tatung Einstein
disc £19.95

A sixty four character line display and the ability to hold over five hundred lines of text at any time are just some of the features of this TASWORD for the Tatung Einstein. Full interaction with the disc system – e.g. TASWORD detects the presence of added drives and allows their use.

MSX 64K COMPUTERS

TASWORD MSX
THE WORD PROCESSOR

TASWORD MSX for 64K MSX computers
cassette £13.90
MSX PRINTER CABLE £8.00

With all the features of the Spectrum TASWORD TWO including the amazing sixty four character per line display. The TASWORD MSX machine code program utilises the 32K of memory not normally available to Basic allowing over five hundred lines of text to be held in memory. The cassette includes a version of the program that can be transferred to disc.



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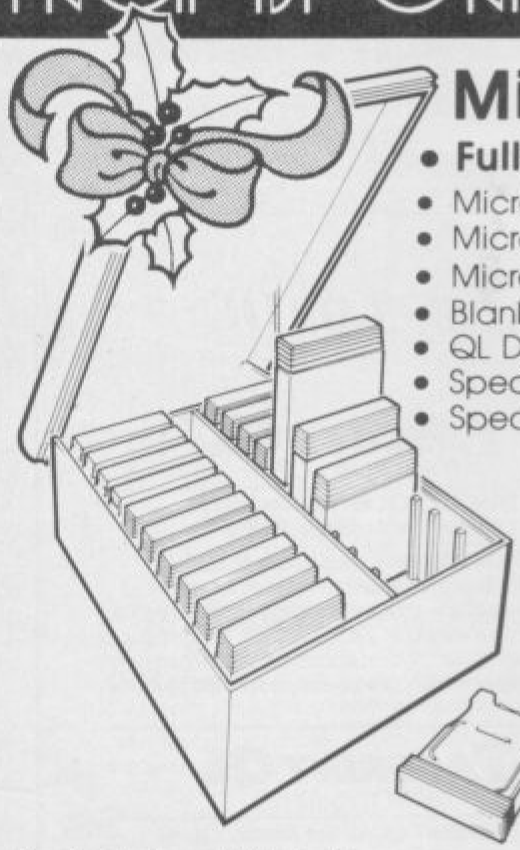
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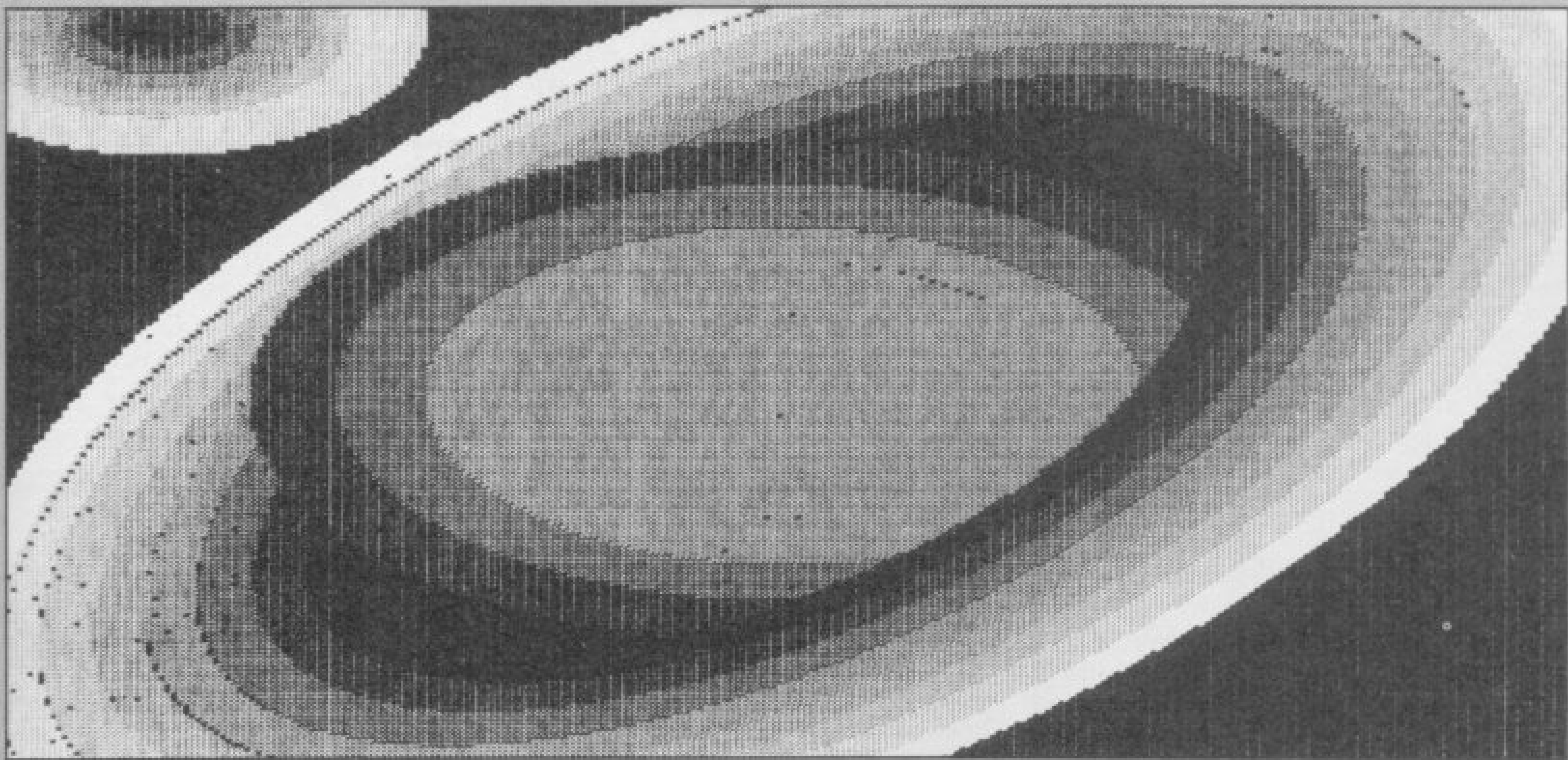
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SU



The picture above is a printout from a QL screen. Jeff Lawson, of Eigen Software, provides the routine which does it

Getting into the picture

IF YOU OWN a Sinclair QL and a printer you might also have a screen dump program. But does it produce a full-sized printout, simulate colour, automatically distinguish between high and low resolution modes, and allow a dump at any time without the need to enter a command?

The program, called **Eigen Dump**, has been written for Epson FX80 and compatible printers, although the actual control codes involved can be easily altered for other dot matrix printers.

Before considering the program itself, we will explain the printout format and discuss the tasks that the program will have to perform.

Epson FX80 quadruple density bit image mode – mode 3 – gives 240 dots per inch or 1920 dots per line. A QL display in low resolution mode measures 256×256 pixels – picture elements or screen dots. Pleasing results are obtained if a pixel is denoted by a 7×3 dot square on the printer – seven dots horizontally. That gives a picture of 1792×768 dots or 7.5×10.7in. which fits neatly on fan-fold paper. The 21 dots per pixel representation will allow us to simulate colour.

Run the SuperBasic program in figure one. By adjusting the colour, contrast and brightness controls on your TV, you can readily see that colours 0-7 follow the exact ordering of a grey scale. Such a scale is given in figure two. Figure three shows the corresponding 7×3 dot patterns we will use to depict each shade of grey. Should you wish to change those patterns then bear in mind that horizontally adjacent dots are not possible in Epson bit image mode 3.

A QL display in high resolution mode gives 256×256 pixels. Optimum results are obtained by printing the picture sideways using a 2×2 dot square per pixel representation in CTR graphics bit image mode – mode 4. That will give a 6.4×14.2in. dump. Four dots per pixel will allow for black, green, red and white – see figure three.

Eigen Dump will multi-task with SuperBasic. To understand what that means, you have to realise that SuperBasic and **Eigen Dump** are completely separate programs or jobs. In addition, there is another program called the operating system, QDOS, that runs in the QL.

QDOS is not a job. It is invoked briefly, at least every fiftieth of a second, to allocate computer time to any jobs that might be present. So the SuperBasic and **Eigen Dump** jobs share the computer time and resources — such as microdrives and a printer.

The object code – generated by assembling the source code in figure six – should be saved and loaded in the usual way with SEXEC and so on. Allow 50 bytes data space for the user stack. If you are not sure about using SEXEC then examine the program in figure seven. For those without an assembler, simply enter and run the program in figure seven. That program will tell you all you need to know.

Holding down ALT and pressing F1 will start a screen dump. That is acknowledged with a short beep. A long beep indicates that the printer is already in use and a dump will not be made. The screen dump may be aborted at any time by holding down the ESC key. Two short beeps will indicate when to take your finger off ESC.

Before using the printer **Eigen Dump** instructs QDOS to stop allocating time to the SuperBasic job. Turning off SuperBasic in that way is not necessary but it does speed up the dump somewhat. Needless to say, SuperBasic is activated on completion of the dump or after ESC has been pressed.

Keeping in mind all that has been discussed so far, you can now direct

continued on page 102

continued from page 101

your attention to figure four (a). That gives an overall plan for **Eigen Dump**. The component actions are grouped together in a large bracket. Details relating to a specific action are given in an adjoining bracket to the right. The actual screen dumping routines for display modes 8 and 4 are given in figures four (b) and four (c) respectively.

A documented source code listing is given in figure six. Note that the data found at FEED12:, MODE 3:, FEED3:, MODE4:, and FEED2: contain printer control codes. The data takes the form of a count followed by the bytes to be sent. FEEDx enables line feeds of x dots. MODE3 gives 240 dots per inch and MODE4 gives 80 dots per inch across the printer. For printers that are not Epson compatible a suitable change to

Figure 1.

```
100 MODE 8
110 WINDOW 512,256,0,0 : PAPER 0 : CLS
120 FOR j=0 TO 23
130 FOR i=0 TO 7
140 PAPER i
150 PRINT'       ';
160 NEXT i
170 PRINT
180 NEXT j
```

Figure 2.

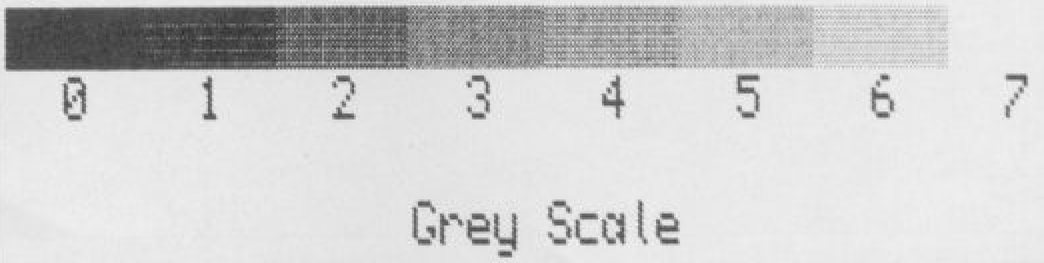


Figure 3.

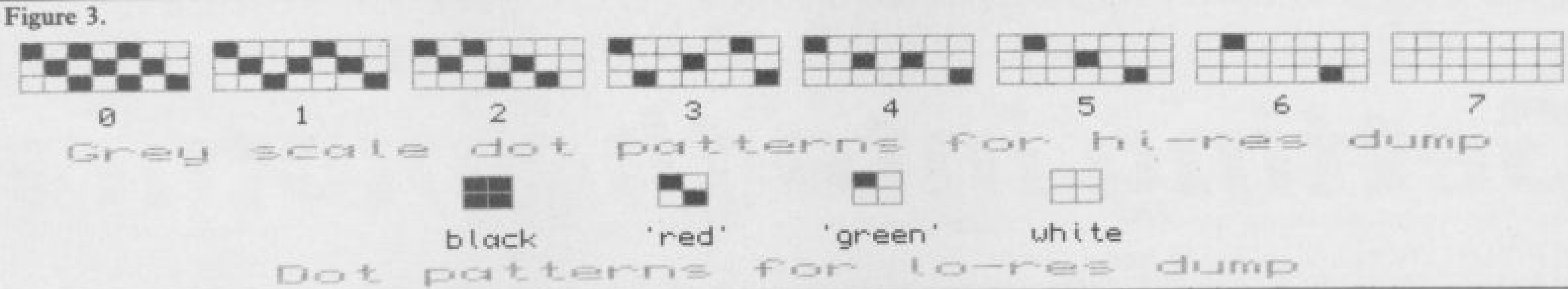


Figure 6.

```
* Set up Eigen Dump as an independant job:
      GO: BRA      START              pass job identification data
          DS.L     1
          DC.W     $4AFB              this is a job
          DC.W     10                 length of name
          DC.W     'Eigen_Dump'       name
* Give Eigen Dump a low priority while waiting for ALT-F1:
   START: MOVEQ    #1,D2              priority 1
          MOVEQ    #-1,D1             this job
          MOVEQ    #$B,D0
          TRAP     #1                 MT.PRIOR
* Monitor the keyboard:
    DUMP: LEA      IPC_ALT(PC),A3     point to IPC command
          MOVEQ    #$11,D0
          TRAP     #1                 MT.IPCOM
          BTST     #2,D1              is ALT being pressed?
          BEQ      DUMP               if not then look again
          LEA      IPC_F1(PC),A3      point to another IPC command
          MOVEQ    #$11,D0
          TRAP     #1                 MT.IPCOM
          BTST     #1,D1              is F1 being pressed?
          BEQ      DUMP               if not then look again
* Acknowledge dump request:
          BSR      BeepShort          give a short beep
* Try to open printer channel:
          LEA      PRINTER(PC),A0     point to channel name
          MOVEQ    #3,D3              new device
          MOVEQ    #-1,D1             channel owned by Eigen Dump
          MOVEQ    #1,D0
          TRAP     #2                 IO.OPEN
          TST.L    D0                 was the channel actually opened?
          BEQ      OK                 if so then continue
          BSR      BeepLong           otherwise give a long beep
          BRA      DUMP               and wait for another request
      OK: LEA      IDP(PC),A1         store
          MOVE.L   A0,(A1)            the channel ID
* Make SuperBASIC inactive:
          MOVEQ    #0,D2              prioriy 0
          MOVEQ    #0,D1              SuperBASIC is always job 0
          MOVEQ    #$B,D0
          TRAP     #1                 MT.PRIOR
* Read the QL display mode:
          MOVEQ    #-1,D2             pretend to read the display type
          MOVEQ    #-1,D1             we really want the display mode
          MOVEQ    #$10,D0
          TRAP     #1                 MT.DMODE
          TST.B    D1                 low or high resolution?
          BEQ      HIGH
          BSR      LO_RES             produce a low resolution dump
          BRA      DONE
    HIGH: BRS      HI_RES             produce a high resolution dump
    DONE: LEA      FEED12(PC),A1      send last line to printer
          BRS      PRINT              and set normal line feeds
* Close printer channel (PRINT puts channel ID in A0):
          MOVEQ    #2,D0
          TRAP     #2                 IO.CLOSE
* Activate SuperBASIC:
          MOVEQ    #32,D2             SuperBASIC has a priority of 32
          MOVEQ    #0,D1              job 0 remember
          MOVEQ    #$B,D0
          TRAP     #1                 MT.PRIOR
          BRA      DUMP               wait for another dump request
* Store for printer channel ID:
     IDP: DS.L     1
* IPC command for ALT key detection:
 IPC_ALT: DC.B     9,1                read the keyboard, one parameter
          DC.L     0                  4 bits to be sent to IPC
          DC.B     7,2                ALT is on row 7, 8 bits for reply
* IPC command for F1 key detection:
  IPC_F1: DC.B     9,1                similarly:
          DC.L     0
          DC.B     0,2                F1 is on row 0
* Channel name:
 PRINTER: DC.W     3,'SER             serial device
          DC.W     2                  two parameters
          DC.W     -1,1               port 1
          DC.W     1,'Z'              send line feeds
* Data for normal (12 dot) line feeds:
  FEED12: DC.W     4                  send 4 bytes
          DC.B     10,27,'A',12
*
* Low resolution dump:
*
* Set 3-dot line feed:
  LO_RES: LEA      FEED3(PC),A1       point to appropriate data
          BSR      PRINT              call printer routine
* Process screen data:
          MOVEA.L  #$20000,A5         base of display file in RAM
          MOVE     #255,D7            256 rows
   LOOP1: MOVE     #63,D6             64 words per row
          BSR      ESC                but is ESC being pressed?
          LEA      MODE3(PC),A1       prepare printer for
          BSR      PRINT              7x256 data bytes
   LOOP2: MOVE     (A5)+,D4           get a screen word
          MOVEQ    #3,D5              four pixels per word
   LOOP3: MOVEQ    #0,D0              clear colour offset
          MOVE.B   D4,D1              *  consider odd screen word:
          LSL.B    #1,D1              *  Shift 2 most significant
          ROXL.B   #1,D0              *  bits into offset.
          LSL.B    #1,D1              *  These determine the red and
          ROXL.B   #1,D0              *  blue components of a pixel.
          LSL      #1,D4           shift green bit   *  also align
          ROXL.B   #1,D0           to offset         *  screen word for
          LSL      #1,D4           discard flash bit *  the next pixel
          LSL      #3,D0              x 8 to generate full offset
          LEA      File8(PC),A4       point to appropriate data file
          ADDA     D0,A4              form pointer to 'colour'
          MOVE     D4,-(A7)           save screen word on stack
          MOVEQ    #6,D4              7 bit image bytes per pixel
   LOOP4: MOVE.B   (A4)+,D1           send a byte of data
          BSR      BYTE               to the printer
          DBRA     D4,LOOP4           next byte
          MOVE     (A7)+,D4           retrieve screen word
          DBRA     D5,LOOP3           next pixel
          DBRA     D6,LOOP2           next word
          DBRA     D7,LOOP1           next row
          RTS                         done!
* Data for Epson quadruple-density bit image mode:
   MODE3: DC.W     5
          DC.B     10,27,'Z',0,7,0
* Data for 3-dot line feed:
   FEED3: DC.W     3
          DC.B     27,'A',3,0
* Printer dot patterns for 8 colour (lo-res) mode:
   File8: DC.B     %10000000,%1000000 BLACK
          DC.B     %10100000,%1000000
          DC.B     %10100000,%1000000
          DC.B     %100000,0
```

Figure 4a.

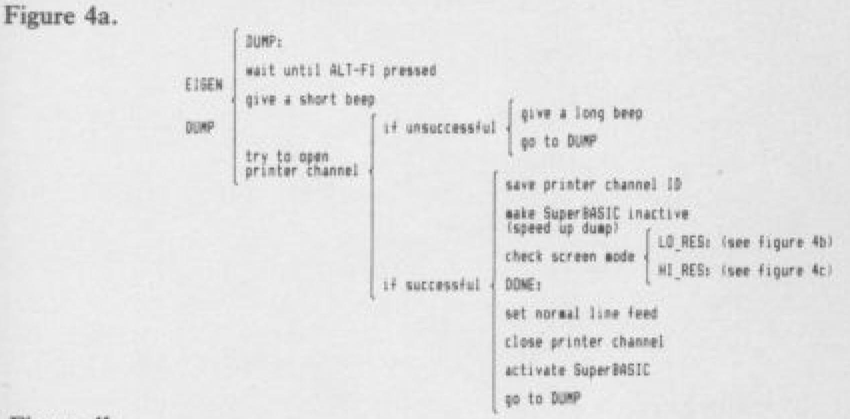


Figure 4b.

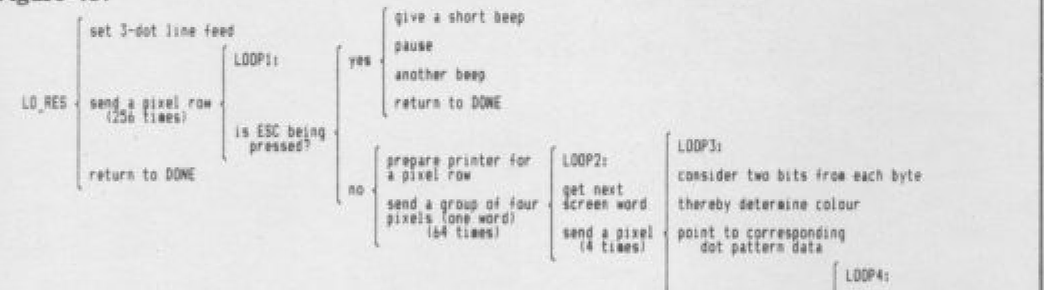
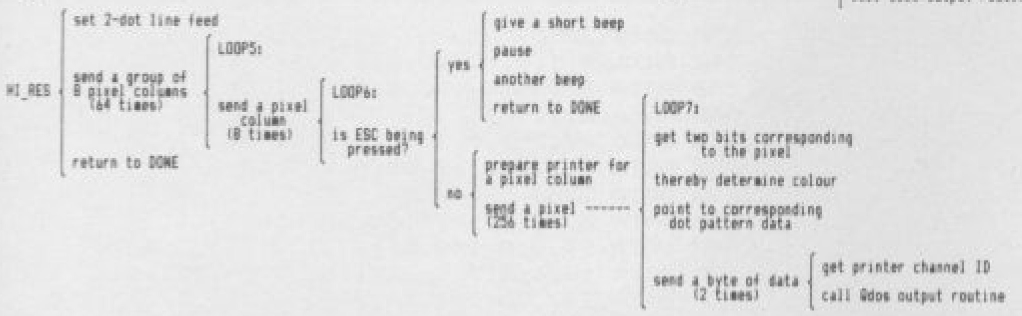


Figure 4c.

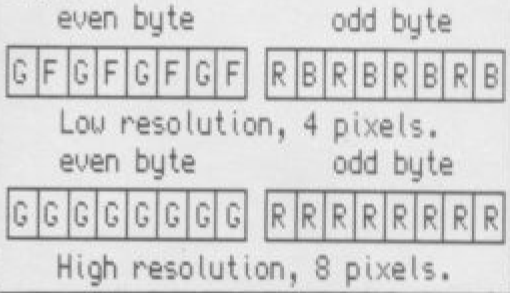


the data must be made.

The QL display consists of 256 rows of 64 words – 256×64×2/1024=32K. Memory locations, \$20000–\$27FFF inclusive, contain the display organised left to right, then top to bottom on the screen.

Eigen Dump handles pixels singly. For a low resolution dump, horizontal rows of the display are printed from top to bottom. For a high resolution

Figure 5.



dump, the display appears sideways on, so vertical columns of pixels are sent to the printer. The first pixel column runs from the bottom-left to the top-right of the screen and is printed horizontally left to right on the paper.

In low resolution mode the QL display uses a word to represent four pixels – see figure five. The two most

continued on page 104

```
          DC.B     %10000000,0          GREEN
          DC.B     %1000000,0
          DC.B     %1000000,0
          DC.B     %100000,0
          DC.B     %10000000,%1000000   BLUE
          DC.B     %100000,%1000000
          DC.B     %10000000,%1000000
          DC.B     %100000,0
          DC.B     0,%10000000          CYAN
          DC.B     0,%1000000
          DC.B     0,%100000
          DC.B     0,0
          DC.B     %10000000,%1000000   RED
          DC.B     %10000000,%100000
          DC.B     %1000000,%100000
          DC.B     0,0
          DC.B     0,%10000000          YELLOW
          DC.B     0,0
          DC.B     0,%100000
          DC.B     0,0
          DC.B     %10000000,%100000    MAGENTA
          DC.B     0,%1000000
          DC.B     0,%10000000
          DC.B     %100000,0
          DC.B     0,0                  WHITE
          DC.B     0,0
          DC.B     0,0
          DC.B     0,0
*
* High resolution dump:
*
* Set 2-dot line feed:
  HI_RES: LEA      FEED2(PC),A1         point to appropriate data
          BSR      PRINT                call printer routine
* Process screen data:
          MOVEA.L  #$20000,A5           base of display file in RAM
          MOVE     #63,D7               64 word-columns
   LOOP5: MOVE     #7,D6                eight pixels per word
   LOOP6: MOVE     #255,D5              256 pixels in a pixel-column
          BSR      ESC                  ESC pressed?
          LEA      MODE4(PC),A1         prepare printer for
          BSR      PRINT                2x256 data bytes
   LOOP7: MOVE     D5,D0                word-column index
          LSL      #7,D0                x 128 to form screen offset
          MOVE     0(A5,D0.L),D2        get screen word
          MOVEQ    #0,D0                 *  select
          MOVEQ    #8,D1                 *  correct
          SUB      D6,D1                 *  pixel
          LSL.B    D1,D2                shift out red bit
          ROXL.B   #1,D0
          LSL      D1,D2                and green bit
          ROXL.B   #1,D0
          LSL      #1,D0                x 2 to form file offset
          LEA      File4(PC),A4         point to appropriate data file
          ADDA     D0,A4                form pointer to 'colour'
          MOVE.B   (A4)+,D1             send a byte of data
          BRS      BYTE                 to the printer
          MOVE.B   (A4),D1              and then
          BSR      BYTE                 another byte
          DBRA     D5,LOOP7             next pixel
          DBRA     D6,LOOP6             next word in column
          ADDQ     #2,A5
          DBRA     D7,LOOP5             next column of words
          RTS                           done!
* Data for Epson CTR graphics bit image mode:
   MODE4: DC.W     6
          DC.B     10,27,'*',4,0,2
* Data for 2-dot line feed:
   FEED2: DC.W     3
          DC.B     27,'A',2,0
* Printer dot patterns for 4 colour (hi-res) mode:
   File4: DC.B     %11000000,%11000000  BLACK
          DC.B     %10000000,0          GREEN
          DC.B     %10000000,%1000000   RED
          DC.B     0,0                  WHITE
* Routine for sending strings to the printer:
   PRINT: LEA      IDP(PC),A0           get printer
          MOVE.L   (A0),A0              channel ID
          MOVEQ    #-1,D3               timeout
          MOVE     (A1)+,D2             number of bytes to be sent
          MOVEQ    #7,D0
          TRAP     #3                   IO.SSTRG
          RTS
* Routine for sending a single byte to the printer:
* Entered with byte in D1.
    BYTE: LEA      IDP(PC),A0           get printer
          MOVE.L   (A0),A0              channel ID
          MOVEQ    #-1,D3               timeout
          MOVEQ    #5,D0
          TRAP     #3                   IO.SBYTE
          RTS
* Check for ESC being pressed:
     ESC: LEA      IPC_ESC(PC),A3       point to IPC command
          MOVEQ    #$11,D0
          TRAP     #1                   MT.IPCOM
          BTST     #3,D1                ESC pressed?
          BNE      ABORT                if so then abort dump
          RTS
   ABORT: BSR      BeepShort            give
          MOVE.L   #$FFFF,D0            two short
   PAUSE: DBRA     D0,PAUSE             beeps in
          BSR      BeepShort            acknowledgement
          MOVE.L   (A7)+,A5             remove the last return address
          RTS                           'done'
* IPC command for ESC key detection:
 IPC_ESC: DC.B     9,1                  read the keyboard, one parameter
          DC.L     0                    4 bits to be sent to IPC
          DC.B     1,2                  ESC is on row 1, 8 bits for reply
* Long beep routine:
BeepLong: LEA      IPClong(PC),A3       point to IPC command
    Beep: MOVEQ    #$11,D0              (BeepShort entry point)
          TRAP     #1                   MT.IPCOM
          RTS
* Short beep routine:
BeepShort: LEA     IPCshort(PC),A3      point to IPC command
          BRA      Beep                 join BeepLong     * IPC command for lon
g beep:
 IPClong: DC.B     $A,8                 sound generation, 8 parameters
          DC.L     $AAAA                8 bits from each parameter byte
          DC.B     50,0                 pitch 1, pitch 2
          DC.W     0,400                0 interval, 400 duration
          DC.B     0,0                  0 pitch step, 0 wrap
          DC.B     1,0                  1 random, 0 fuzziness
* IPC command for short beep:
IPCshort: DC.B     $A,8                 similarly:
          DC.L     $AAAA
          DC.B     150,140              higher pitch
          DC.W     0,10                 shorter duration
          DC.B     0,0
          DC.B     1,0                                  * That's all folks!
```

continued from page 103

significant bits – MSBs – from the odd byte correspond to red and blue components for the left most pixel. The two MSBs from the even byte give the green component and flash toggle. Hence bits R, B and G are used to find the correct bit pattern in File8. Seven colours and black are available.

G bit	R bit	B bit	colour	SuperBasic colour code
0	0	0	black	0
0	0	1	blue	1
0	1	0	red	2
0	1	1	magenta	3
1	0	0	green	4
1	0	1	cyan	5
1	1	0	yellow	6
1	1	1	white	7

In high resolution mode the QL display uses a word to represent eight pixels – see figure five. A bit from the odd byte gives the red component and a bit from the even byte gives the green component. The MSB from each byte corresponds to the left-most pixel. Three colours and black are available:

G bit	R bit	colour
0	0	black
0	1	red
1	0	green
1	1	white

The hardware forces white rather than yellow. G and R bits are used to find the correct bit pattern in File4.

Several demonstration screen dumps accompany this article. You may like to modify **Eigen Dump** to suit your needs. By sending more information per data byte and increasing the number of dots per line feed a faster dump is possible, although the program would have to be radically altered.

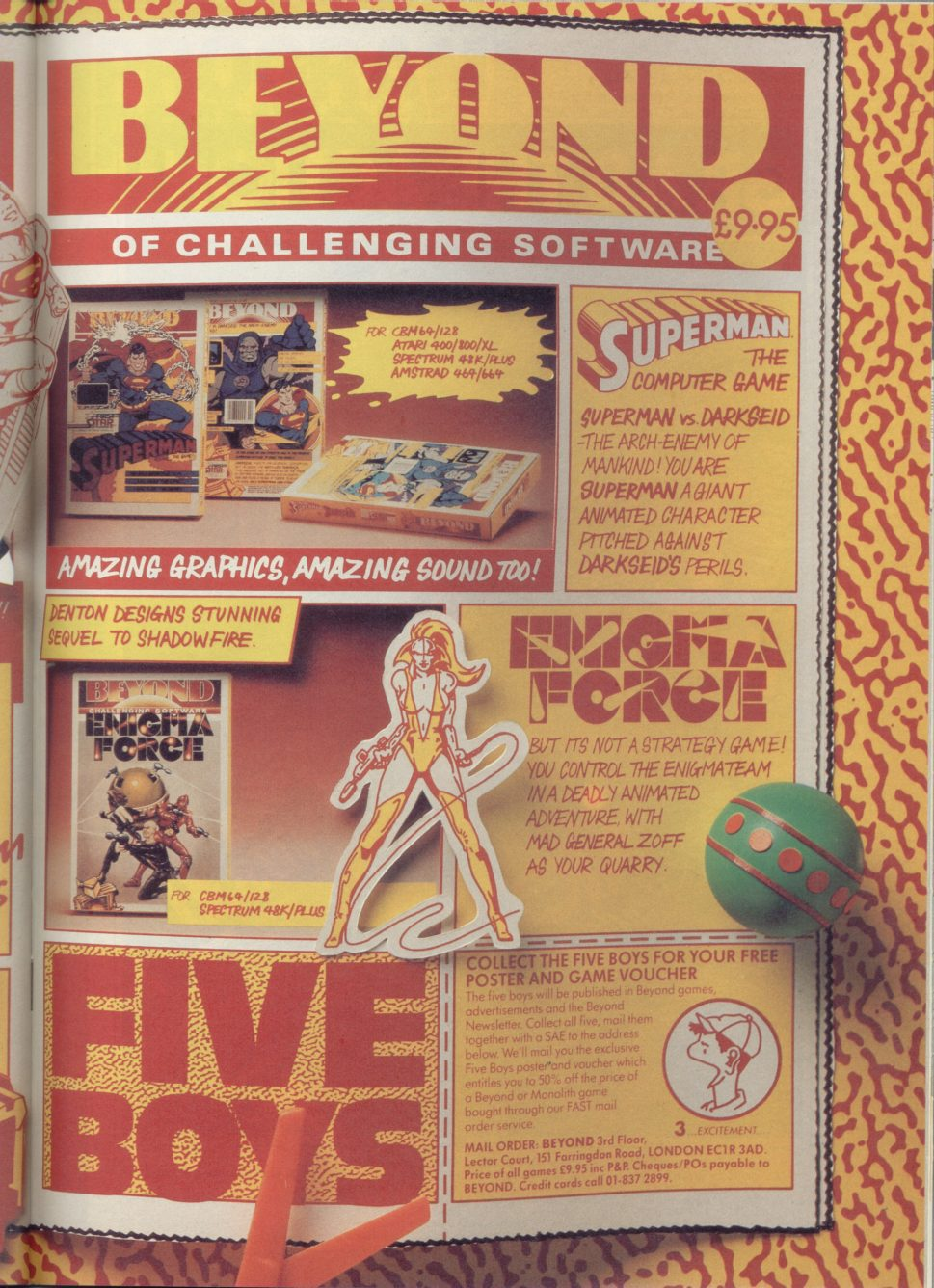
Although you may freely use **Eigen Dump**, copyright is owned by Eigen Software and direct commercial gain is prohibited.

Figure 7.

```
100 MODE 8 : WINDOW 512,256,0,0 : PAPER 2 :
  INK 7 : CLS
110 AT 9,11 : PRINT'Eigen Dump generator' :
  UNDER 1 : CURSOR 132,100 : PRINT'
                    ' : UNDER 0
120 AT 14,9 : PRINT'Please make sure that a'
 : AT 16,4 : PRINT'formatted cartridge is in
  drive 2.'
130 AT 22,9 : PRINT'Press a key to continue.'
140 PAUSE
150 CLS
160 AT 10,15 : PRINT'Please wait!'
170 RESTORE
180 LET base = RESPR(580)
190 FOR i=0 TO 11
200 LET sum1=0
210 FOR j=0 TO 49
220 READ a : POKE base+i*50+j,a
230 LET sum1=sum1+a
240 NEXT j
250 READ sum2
260 IF sum1<>sum2 THEN GO TO 330
270 NEXT i
280 SEXEC mdv2_Eigen_Dump,base,580,50
290 CLS
300 AT 10,8 : PRINT'Use:  EXEC mdv2_Eigen_Dump'
  : AT 12,11 : PRINT'to load Eigen
 Dump.'
310 PAUSE
320 STOP
330 CLS
340 AT 10,6 : PRINT'Error in data statement
  between' : AT 12,6 : PRINT'lines ';3
60+i*60;' and ';410+i*60;' inclusive.'
350 STOP
360 DATA 96,18,0,0,0,0,74,251,0,10
370 DATA 69,105,103,101,110,95,68,117,109,112
380 DATA 116,1,114,255,112,11,78,65,71,250
390 DATA 0,112,112,17,78,65,8,1,0,2
400 DATA 103,242,71,250,0,106,112,17,78,65
410 DATA 3950
420 DATA 8,1,0,1,103,228,97,0,1,228
430 DATA 65,250,0,96,118,3,114,255,112,1
440 DATA 78,66,74,128,103,6,97,0,1,198
450 DATA 96,202,67,250,0,54,34,136,114,0
460 DATA 116,0,112,11,78,65,114,255,116,255
470 DATA 4507
480 DATA 112,16,78,65,74,1,103,4,97,70
490 DATA 96,4,97,0,0,238,67,250,0,56
500 DATA 97,0,1,82,112,2,78,66,114,0
510 DATA 116,32,112,11,78,65,96,146,0,0
520 DATA 0,0,9,1,0,0,0,0,7,2
530 DATA 2655
540 DATA 9,1,0,0,0,0,0,2,0,3
550 DATA 83,69,82,32,0,2,255,255,0,1
560 DATA 0,1,90,32,0,4,10,27,65,12
570 DATA 67,250,0,100,97,0,1,18,42,124
580 DATA 0,2,0,0,62,60,0,255,60,60
590 DATA 2233
600 DATA 0,63,97,0,1,30,67,250,0,66
610 DATA 97,0,0,248,56,29,122,3,112,0
620 DATA 18,4,227,9,227,16,227,9,227,16
630 DATA 227,76,227,16,227,76,231,72,73,250
640 DATA 0,48,216,192,63,4,120,6,18,28
650 DATA 4391
660 DATA 97,0,0,224,81,204,255,248,56,31
670 DATA 81,205,255,212,81,206,255,204,81,207
680 DATA 255,184,78,117,0,5,10,27,90,0
690 DATA 7,0,0,3,27,65,3,0,128,64
700 DATA 160,64,160,64,32,0,128,0,64,0
710 DATA 4718
720 DATA 64,0,32,0,128,64,32,64,128,64
730 DATA 32,0,0,128,0,64,0,32,0,0
740 DATA 128,64,128,32,64,32,0,0,0,128
750 DATA 0,0,0,32,0,0,128,32,0,64
760 DATA 0,128,32,0,0,0,0,0,0,0
770 DATA 1824
780 DATA 0,0,67,250,0,92,97,102,42,124
790 DATA 0,2,0,0,62,60,0,63,60,60
800 DATA 0,7,58,60,0,255,97,112,67,250
810 DATA 0,58,97,76,48,5,239,72,52,53
820 DATA 8,0,112,0,114,8,146,70,227,42
830 DATA 3414
840 DATA 227,16,227,106,227,16,227,72,73,250
850 DATA 0,42,216,192,18,28,97,58,18,20
860 DATA 97,54,81,205,255,216,81,206,255,200
870 DATA 84,77,81,207,255,190,78,117,0,6
880 DATA 10,27,42,4,0,2,0,3,27,65
890 DATA 5055
900 DATA 2,0,192,192,128,0,128,64,0,0
910 DATA 65,250,254,188,32,80,118,255,52,25
920 DATA 112,7,78,67,78,117,65,250,254,172
930 DATA 32,80,118,255,112,5,78,67,78,117
940 DATA 71,250,0,32,112,17,78,65,8,1
950 DATA 4801
960 DATA 0,3,102,2,78,117,97,34,32,60
970 DATA 0,0,255,255,81,200,255,254,97,22
980 DATA 42,95,78,117,9,1,0,0,0,0
990 DATA 1,2,71,250,0,14,112,17,78,65
1000 DATA 78,117,71,250,0,20,96,244,10,8
1010 DATA 3790
1020 DATA 0,0,170,170,50,0,0,0,1,144
1030 DATA 0,0,1,0,10,8,0,0,170,170
1040 DATA 150,140,0,0,0,10,0,0,1,0
1050 DATA 0,0,0,0,0,0,0,0,0,0
1060 DATA 0,0,0,0,0,0,0,0,0,0
1070 DATA 1195
```


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PROGRAM PRINTOUT



GRAPHICS INSTRUCTIONS

IN GENERAL, graphics abbreviations are enclosed in brackets, which should not be entered. A string of the same graphics character is represented in the form (3*A) which would be entered as AAA, where A is the graphics character. A space, where it is important to have the correct number of spaces, is indicated by (sp). Spaces in text will not normally be indicated. Where several graphics characters are used, they are separated by commas, which should not be entered. With Spectrum and QL listings the letter l has a flat top and the numeral 1 has a sloping top.

The above applies to all Sinclair machines. The following instructions are for specific machines.

ZX-81: ZX-81 listings are generally reproduced as they appear when you enter them, spaces and all. Where extensive graphics are used, REM statements will be inserted to provide a guide to the position of each character.

Spectrum: User-defined graphics are represented by underlined letters, without brackets. Type the appropriate letter while in graphics mode. The underline does not appear on the screen. Inverse characters have the letter i before them, e.g. iZ, iA, iP. Block graphic characters are indicated by g followed by the number of the appropriate key: g4 would mean the block graphics on key 4, ig4 the inverse of that graphic.

Control codes are indicated by cc before the character, and are obtained by pressing CAPS SHIFT while in extended mode. They do not appear on the screen but may change the colour of the cursor and will affect what is printed after them: cc3,i* would thus have the effect of printing an inverse asterisk in red.

QL: User-defined graphics on the QL are indicated by a description of the keys pressed to obtain them, underlined and in brackets. Thus (CTRL + 9) means press CTRL and 9 together. The same applies for unusual characters within the QL character set, which our printer is unable to reproduce.

GUIDE ORTHIUS through the deadly caverns to escape from the hordes of rats, rabbits and spiders which infest the underground warrens. An extremely tough maze game, **Orthius** was written by C Murray of Redditch, and runs on any Spectrum.

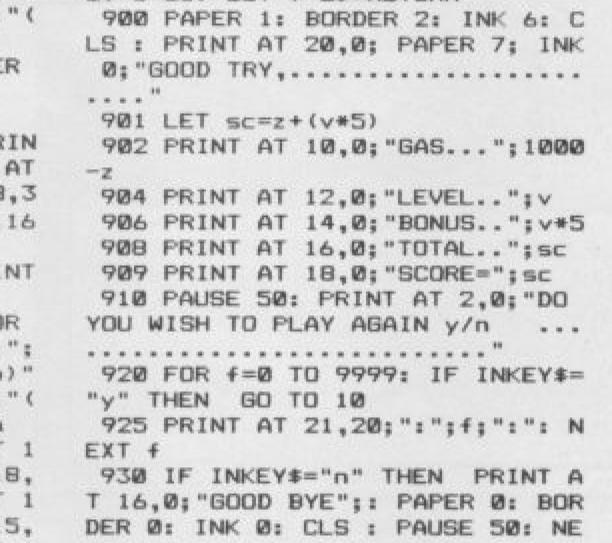
The program uses our special abbreviations for graphics characters, so please read the instuctions above before typing in the listing.

```
   1 GO SUB 1080: LET sc=0: LET
hi=100
   2 PAPER 1: BORDER 1: INK 5: C
LS
   3 INPUT AT 0,7;"NAME:"; LINE
a$
   4 IF LEN a$=0 THEN  GO TO 2
   5 IF LEN a$>=8 THEN  GO TO 2
  10 IF sc>=hi THEN  LET hi=sc
  11 GO SUB 990
  12 LET v=1
  14 LET u=3
  16 LET z=0
  20 PAPER 0: INK 1: BORDER 0: C
LS
  22 BEEP .01,10
  30 BEEP .01,20
  40 IF sc>=hi THEN  LET hi=sc
  50 IF v=1 THEN  GO SUB 680
  55 IF v=2 THEN  GO SUB 820
  56 IF v=3 THEN  GO SUB 2000
  60 RESTORE 1080: FOR n=1 TO v:
 READ lm: NEXT n
  65 PRINT AT y,x; INK 8;"A"
  67 PRINT AT a,b; INK 6;"B"
  68 PRINT AT c,d; INK 2;"C"
  69 PRINT AT e,f; INK 5;"E"
  70 PRINT #0;AT 0,0; INK 4;"<LI
VES>";u
  75 PRINT #0;AT 0,17; INK 5;"<L
EVEL>";v
  78 PRINT #0;AT 1,0; INK 5;"<TO
P>";hi
  80 LET z=z+4
  87 IF z>=1000 THEN  GO TO 3000
  88 PRINT AT 11,24;"O";AT 20,24
;"O"
 110 IF y=11 AND x=24 THEN  PRIN
T AT y,x; PAPER 3;"(sp)": LET y=
y+9
 120 IF y=1 AND x=1 THEN  GO TO
520
 130 LET a$=INKEY$
 140 LET x1=x: LET y1=y
 150 LET x=x+(a$="p" AND ATTR (y
,x+1)=89)-(a$="o" AND ATTR (y,x-
1)=89)
 160 LET y=y+(a$="a" AND ATTR (y
+1,x)=89)-(a$="q" AND ATTR (y-1,
x)=89)
 170 PRINT #0;AT 1,17;"<GAS>";z;
"(sp)"
 180 IF y=3 AND x=2 THEN  GO SUB
960
 185 IF y=4 AND x=26 THEN  GO TO
630
 190 IF y=19 AND x=5 THEN  GO SU
B 970
 200 IF y=1 AND x=29 OR y=1 AND
x=30 THEN  GO TO 560
 210 IF x1<>x OR y1<>y THEN  PRI
NT AT y,x; INK 8;"A": PRINT AT y
1,x1;"(sp)"
 220 IF lm=0 THEN  GO TO 520
 230 LET a1=a: LET b1=b: LET c1=
c: LET d1=d: LET e1=e: LET f1=f
 240 IF RND>.6 THEN  GO TO 80
 250 LET aa=a
 260 LET a=a+(a<y AND ATTR (a+1,
b)=89)-(a>y AND ATTR (a-1,b)=89)
 270 IF a<>aa THEN  GO TO 290
 280 LET b=b+(b<x AND ATTR (a,b+
1)=89)-(b>x AND ATTR (a,b-1)=89)
 290 IF a1<>a OR b1<>b THEN  PRI
NT AT a,b; INK 0;"B";AT a1,b1; I
NK 1;"(sp)"
 300 IF y=a AND x=b THEN  GO TO
440
 310 LET cc=c
 320 LET c=c+(c<y AND ATTR (c+1,
d)=89)-(c>y AND ATTR (c-1,d)=89)
 330 IF c<>cc THEN  GO TO 350
 340 LET d=d+(d<x AND ATTR (c,d+
1)=89)-(d>x AND ATTR (c,d-1)=89)
 350 IF c1<>c OR d1<>d THEN  PRI
NT AT c,d; INK 1;"C";AT c1,d1;"(
sp)"
 360 IF y=c AND x=d THEN  GO TO
440
 370 LET ee=e
 380 LET e=e+(e<y AND ATTR (e+1,
f)=89)-(e>y AND ATTR (e-1,f)=89)
 390 IF e<>ee THEN  GO TO 420
 400 LET f=f+(f<x AND ATTR (e,f+
1)=89)-(f>x AND ATTR (e,f-1)=89)
 410 IF y=e AND x=f THEN  GO TO
440
 420 IF e1<>e OR f1<>f THEN  PRI
NT AT e,f; INK 6;"E";AT e1,f1; I
NK 1;"(sp)"
 430 GO TO 80
 440 BORDER 2: FOR f=0 TO 50 STE
P 5: BEEP .005,f: BEEP .004,60-f
: NEXT f
 450 LET u=u-1
 455 PAPER 0: INK 7: CLS
 460 IF u<=0 THEN  PRINT AT 7,10
; FLASH 1; INK 4; PAPER 2;"GAME
OVER": PAUSE 100: BORDER 0: GO T
O 900
 465 IF z>=1000 THEN  PRINT AT 7
,10; FLASH 1; INK 4; PAPER 2;"No
 Air Left": PAUSE 500: BORDER 7:
 GO TO 3000
 470 IF a=y AND b=x THEN  PRINT
AT 10,4;"THE RABBIT FLATTENED ME
.": PAUSE 150: GO TO 20
 480 IF c=y AND d=x THEN  PRINT
AT 10,4;"THE RAT BIT ME.": PAUSE
 150: GO TO 20
 490 IF e=y AND f=x THEN  PRINT
AT 10,4;"THE SPIDER HIT ME.": PA
USE 150: GO TO 20
 495 PRINT AT 10,4;"HELP,IM BEIN
G EATEN....";: PAUSE 150: GO TO 20
 520 DATA 1,5,8,6
 530 DATA 2,5,7,4
```

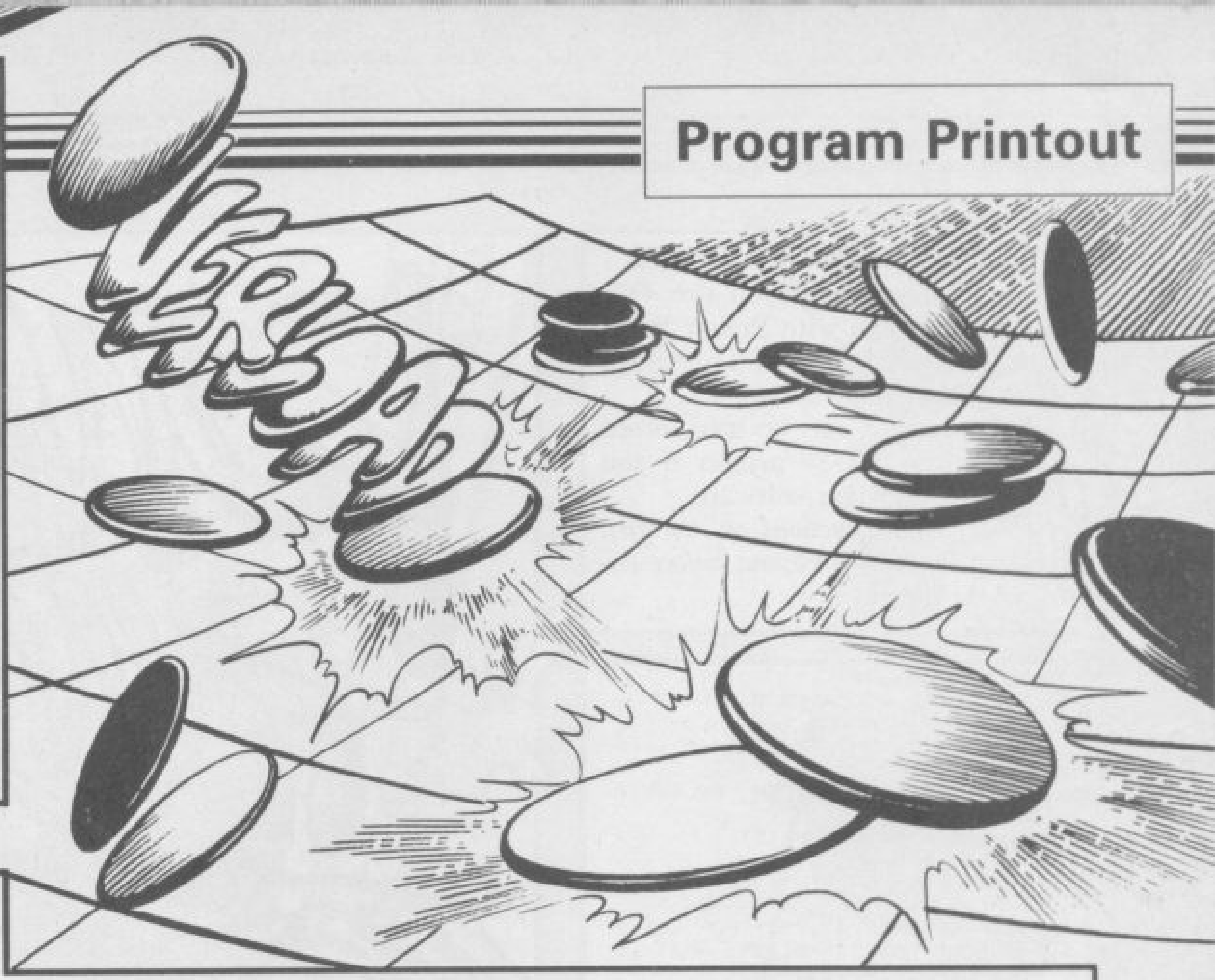
continued on page 110

continued from page 109

```
540 DATA 3,4,6,3
550 DATA 4,3,5,4
560 FOR j=1 TO 2: RESTORE 520
570 FOR m=1 TO 4: FOR n=1 TO 4: READ a: BEEP .1,a: NEXT n: NEXT m
580 NEXT j
590 IF v=3 THEN  GO TO 640
600 LET v=v+1
605 PAPER 0: INK 7: CLS : PRINT AT 12,8;"E S C A P E D": FOR f=0 TO 30: BORDER 1: BORDER 3: BORDER 5: BORDER 7: BORDER 2: PAUSE 1: NEXT f
610 PAPER 0: INK 7: CLS : PRINT AT 10,10; FLASH 1;"VENTURE";AT 12,10;"LEVEL-";v;AT 14,10;"AND ";u;" BITE(s) to go"
620 PAUSE 1000: CLS : GO TO 20
640 LET z=z-550
645 LET u=u+1
650 PAPER 3: CLS : PRINT AT 10,0; FLASH 1;"EXTRA MAN..EXTRA POINTS.........": FOR f=0 TO 500: LET z=z-100: NEXT f: LET v=1: GO TO 20
670 PAUSE 100: GO TO 20
680 PAUSE 100: CLS : PRINT AT 10,5; INK 7;"BOARD I:THE WARREN": PAUSE 100: CLS : PAPER 5
682 IF z>=500 THEN  LET z=z-200
685 FOR f=0 TO 11: PRINT AT f,0; INK 1; PAPER 6;"(32*G)";: NEXT f
688 FOR f=11 TO 21: PRINT AT f,0; INK 0; PAPER 7;"(32*G)";: NEXT f
690 PRINT AT 20,3; PAPER 3;"(sp)";
700 PRINT AT 20,6; PAPER 3;"(13*sp)";
710 PRINT AT 20,5; FLASH 1; INK 4; PAPER 1;"A"
720 PAPER 3: PRINT AT 0,29;"(2*sp)";AT 1,29;"(2*sp)";AT 2,29;"(2*sp)"
730 PRINT AT 3,1; INK 7; PAPER 3;"O";
740 PRINT AT 3,2;"(16*sp)";
750 PRINT AT 18,16;"(sp)": PRINT AT 4,3;"(sp)";AT 5,3;"(sp)";AT 6,3;"(sp)";AT 7,3;"(sp)";AT 8,3;"(sp)";AT 17,16;"(sp)";AT 16,16;"(sp)";AT 15,16;"(2*sp)"
760 PRINT AT 10,2;"(sp)": PRINT AT 10,3;"(14*sp)";
770 PRINT AT 10,17;"(sp)": FOR a=18 TO 29: PRINT AT 1,a;"(sp)";AT 10,a;"(sp)";AT 17-a,18;"(sp)";AT 17-a,29;"(sp)";AT 10-a,18;"(sp)";AT 10-a,1;"(sp)";: NEXT a
780 PRINT AT 19,2;"(5*sp)";AT 16,9;"(sp)";AT 17,9;"(sp)";AT 18,9;"(7*sp)";AT 17,4;"(3*sp)";AT 18,4;"(sp)";AT 18,6;"(sp)";AT 15,1;"(6*sp)";AT 14,6;"(4*sp)";AT 15,9;"(sp)";
790 PRINT AT 5,18;"(11*sp)"
800 PRINT AT 18,19;"(7*sp)";AT 14,22;"(5*sp)";AT 15,26;"(sp)";AT 17,25;"(sp)";AT 16,21;"(6*sp)";AT 15,21;"(sp)";AT 14,21;"(sp)"
802 PRINT AT 8,3;"(10*sp)";AT 9,7;"(sp)"
803 PRINT AT 5,26; PAPER 1; INK 6;"E";
804 PRINT AT 1,26; PAPER 1; INK 6;"E";
805 LET y=13: LET x=26: LET a=3: LET b=30: LET c=10: LET d=27: LET e=8: LET f=2: LET x1=0: LET y1=0: LET a1=0: LET b1=0: LET c1=0: LET d1=0: LET e1=0: LET f1=0
809 PRINT AT 19,24;"(sp)"
810 PRINT AT 4,18; INK 1; PAPER 7;"G"
813 PRINT AT 11,26; PAPER 3;"(sp)";AT 12,26;"(sp)";AT 13,26;"(sp)"
815 PRINT AT 8,29; INK 0; PAPER 6;"G";
817 PRINT AT 15,19;"(2*sp)";AT 14,27; INK 7; PAPER 0;"O"
818 RETURN : REM (9*ig8)END 1
820 PAPER 1: BORDER 0: INK 1: CLS : PRINT AT 10,2; INK 7;"BOARD II:THE CHASE";: PAUSE 100: CLS
822 LET z=z-100
825 FOR f=0 TO 21: PRINT "F";TAB 31;"F": NEXT f
830 FOR f=1 TO 11 STEP 2: PRINT AT f,0; PAPER 0; INK 4;"H(sp)H(sp)I(sp)I(sp)I(sp)I(sp)IHIHIHIH(sp)H(sp)H(sp)H(sp)H(sp)H(sp)H";: NEXT f
835 FOR f=13 TO 21 STEP 2: PRINT AT f,0; PAPER 0; INK 4;"H(sp)H(sp)I(sp)I(sp)I(sp)I(sp)IHIHIHIH(sp)H(sp)H(sp)H(sp)H(sp)H(sp)H";: NEXT f
840 FOR f=0 TO 21 STEP 2: PRINT AT f,1; PAPER 3;"(30*sp)";: NEXT f
850 PAPER 3: FOR r=1 TO 20: FOR f=1 TO 12 STEP 2: PRINT AT 21-r,f;"(sp)";: NEXT f: NEXT r
860 FOR r=1 TO 20: FOR f=1 TO 12 STEP 2: PRINT AT 21-r,19+f;"(sp)";: NEXT f: NEXT r
870 PRINT AT 0,0; INK 7; BRIGHT 1;"F(sp)F(27*D)GG";AT 21,0; INK 7;"(28*G)F(sp)FD";
876 PRINT AT 4,26; PAPER 1; INK 5;"D";
```



```
880 LET y=20: LET x=29: LET a=10: LET b=29: LET c=1: LET d=2: LET e=20: LET f=2: RETURN
900 PAPER 1: BORDER 2: INK 6: CLS : PRINT AT 20,0; PAPER 7; INK 0;"GOOD TRY,......................"
901 LET sc=z+(v*5)
902 PRINT AT 10,0;"GAS...";1000-z
904 PRINT AT 12,0;"LEVEL..";v
906 PRINT AT 14,0;"BONUS..";v*5
908 PRINT AT 16,0;"TOTAL..";sc
909 PRINT AT 18,0;"SCORE=";sc
910 PAUSE 50: PRINT AT 2,0;"DO YOU WISH TO PLAY AGAIN y/n    ..............................."
920 FOR f=0 TO 9999: IF INKEY$="y" THEN  GO TO 10
925 PRINT AT 21,20;":";f;":": NEXT f
930 IF INKEY$="n" THEN  PRINT AT 16,0;"GOOD BYE": PAPER 0: BORDER 0: INK 0: CLS : PAUSE 50: NEW
940 BEEP .01,RND*10: GO TO 920
950 NEXT f: GO TO 10
960 BEEP .03,22: LET sc=sc-300: LET y=14: LET x=27: RETURN
970 LET z=z-90: PRINT AT y,x; INK 3; PAPER 3;"(sp)";: LET y=14: LET x=27: PRINT AT 1,26;"(sp)";AT 5,26;"(sp)";: RETURN
980 BEEP .01,10: RETURN
990 PAPER 0: INK 7: BRIGHT 1: BORDER 0: CLS
1000 PRINT AT 2,0; FLASH 1; INK 7;"(13*A)ORTHIUS(12*A)";: PAUSE 25
1010 PRINT AT 4,0; INK 6;"Guide Orthius up to the top of  the chambers of Rats,Rabbits andSpiders that will either eat,   bite,squash or flatten you.        "
1015 PRINT AT 9,0; INK 5;"MOVING USES UP GAS:0-1000     THE HIGHER IT IS THE WORSE IT IS"
1020 PRINT AT 11,0; INK 5;"AKEYS AQ,A :UP,DOWN          AKEYS AO,P :LEFT,RIGHT"
1021 PRINT AT 14,0;a$;AT 15,0; INK 4;" IS THE PLAYER OF ORTHIUS."
1022 PRINT AT 16,0; INK 3;"OLD SCORE IS ";sc
1030 PRINT AT 19,0; INK 2; BRIGHT 1;"HIGHEST SCORE IS "; INK 5;hi
1040 PRINT #0;AT 0,0; PAPER 0; INK 7; BRIGHT 1;". . . .G E T  R E A D Y . . ."
1050 PRINT #0;AT 1,0; PAPER 0; INK 7;"H I T  A  K E Y  T O  S T A R T"
1060 FOR f=299 TO 0 STEP -1: PRINT AT 0,27; INK 2;f;"(sp)": BEEP .01,60: IF INKEY$="" THEN  BORDER RND*2: NEXT f
1070 RETURN
1080 DATA 65,89,79,86,131,83,53,66
1090 DATA 48,252,180,180,48,40,40,108
1100 DATA 12,12,7,127,252,252,252,102
1110 DATA 24,14,15,28,62,60,60,254
1120 DATA 136,136,216,33,62,32,80,136
1130 DATA 126,36,60,56,84,84,145,145
1140 DATA 99,98,97,3,5,12,29,29
1145 DATA 102,203,107,102,104,232,122,164
1147 DATA 50,22,44,123,233,112,188,199
1148 DATA 119,49,119,219,139,149,139,149
1150 RESTORE 1090: FOR n=USR "a" TO USR "i"+7: READ a: POKE n,a: NEXT n
1160 RETURN
2000 PAPER 5: BORDER 3: INK 1: CLS
2010 PRINT AT 10,5; INK 7; PAPER 0;"BOARD III:THE SEWER": PAUSE 100: CLS
2020 LET z=z-100
2100 FOR f=6 TO 12: PRINT AT f,0; INK 4; PAPER 0;"(32*F)": NEXT f
2105 FOR f=13 TO 21: PRINT AT f,0; INK 5; PAPER 1;"(32*F)": NEXT f
2110 NEXT f
2120 PAPER 3
2130 PRINT AT 20,6;"(21*sp)";AT 19,6;"(21*sp)"
2140 PRINT AT 21,1;"(7*sp)"
2150 PRINT AT 18,10;"(2*sp)";AT 18,25;"(2*sp)"
2160 PRINT AT 17,10;"(2*sp)";AT 17,25;"(2*sp)"
2170 PRINT AT 15,5;"(22*sp)";AT 16,5;"(22*sp)"
2180 PRINT AT 15,2;"(2*sp)";AT 16,3;"(2*sp)"
2200 PRINT AT 14,2;"(2*sp)"
2210 PRINT AT 13,2;"(2*sp)"
2220 PRINT AT 12,3;"(22*sp)";AT 13,3;"(26*sp)"
2250 PRINT AT 9,7;"(22*sp)";AT 10,7;"(22*sp)"
2260 PRINT AT 20,26;"(4*sp)"
2265 FOR f=6 TO 24 STEP 2: PRINT AT 14,f;"(sp)";: NEXT f
2270 FOR f=1 TO 11: PRINT AT 20-f,28;"(sp)": NEXT f
2280 FOR z=1 TO 20 STEP 2: FOR f=1 TO 7: PRINT AT 11-f,7+z;"(sp)": NEXT f: NEXT z
2290 PRINT AT 11,20;"(sp)";AT 11,24;"(sp)";AT 15,27;"(sp)"
2295 PRINT AT 11,24;"O";AT 20,24;"O"
2299 INK 7
2300 PLOT 60,128: DRAW 0,15: DRAW 160,0: DRAW 0,-15: DRAW 3,0: DRAW 0,20: DRAW -166,0: DRAW 0,-20
2309 LET x=7: LET y=20: LET a=10: LET b=15: LET c=7: LET d=26: LET e=19: LET f=29: LET x1=0: LET y1=0: LET a1=0: LET b1=0: LET c1=0: LET d1=0: LET e1=0: LET f1=0
2310 INK 1: RETURN
3000 PAPER 7: BORDER 7: INK 0: CLS
3010 PRINT AT 10,1;"THE DEADLY GAS KNOCKED YOU OUT"
3020 PRINT AT 12,0;"SOME GAS WENT...."
3030 FOR f=0 TO 299: NEXT f: LET z=z-400: GO TO 20
9998 PAPER 7: INK 0: BORDER 7: BRIGHT 0: CLS : STOP
9999 SAVE "ORTHIUS" LINE 1: VERIFY "": PAUSE 100: RUN
```



IT'S NOT OFTEN you come across a genuinely new stategy game, but **Overload** by Jason Butler of Holmes Chapel, Cheshire, is one such.

In this two-player game, each player places counters on the board. When four counters of the same colour are piled together, they explode, scattering to surrounding squares. When the board gets full, chain reactions are set off as more and more squares overload in succession, like an abstract nuclear reaction. The game runs on the 48K Spectrum.

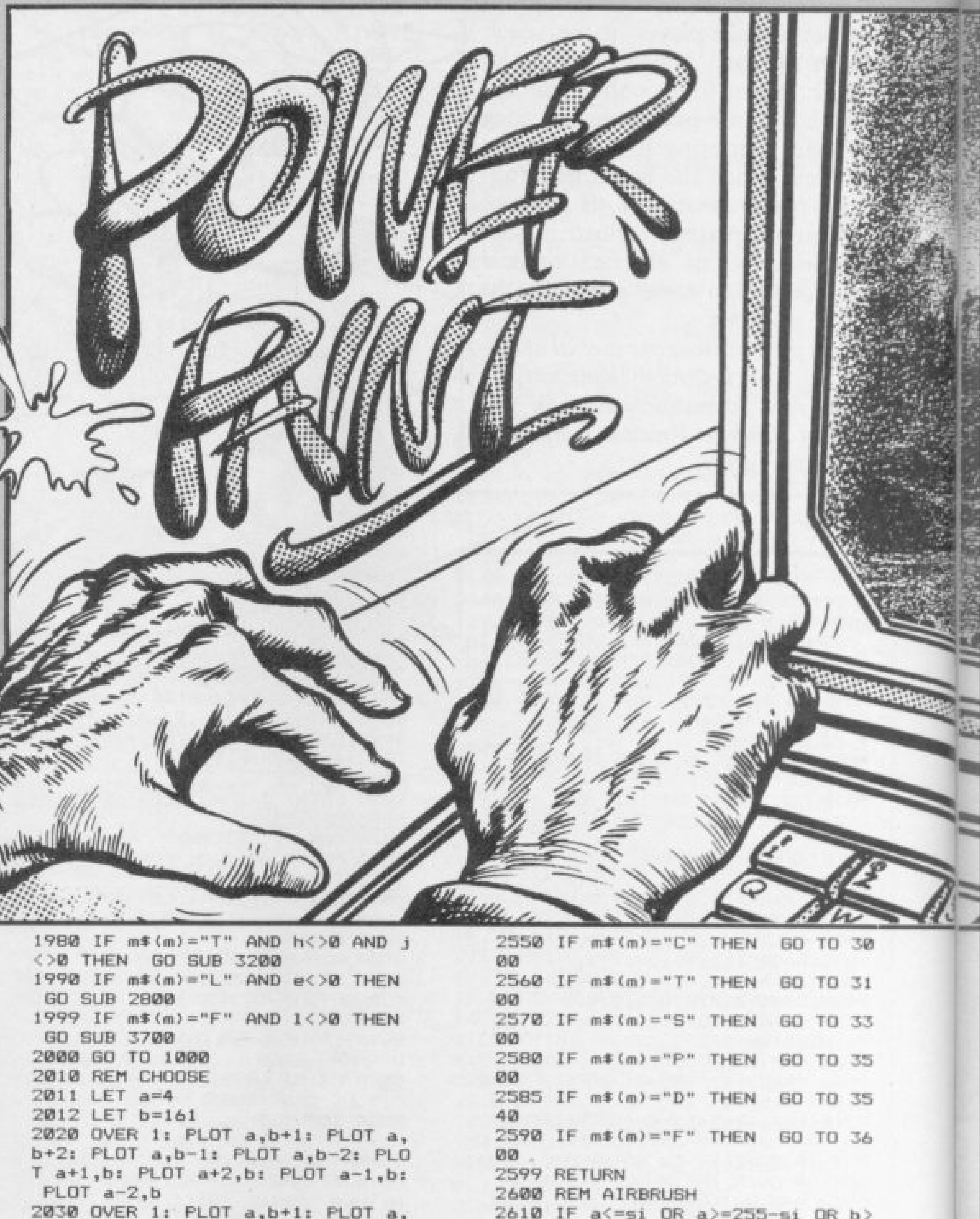
The program uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout before typing in the listing.

```
  10 REM OVERLOAD!!
  20 DIM A$(2,5): DIM A(6,9): DI
M B(6,9)
  25 GO SUB 7000: REM USER DEFS
  30 GO SUB 7500: REM INSTRUCT.
  40 GO SUB 8000: REM SCREEN
  50 GO SUB 8500: REM PLAYERS GO
  60 GO SUB 9000: REM BANG!!
  70 GO TO 50
7000 REM USER DEFINED CHARS
7010 LET X=255: LET Y=128
7020 FOR F=144 TO 151: FOR N=0 T
O 7: READ A: POKE USR (CHR$ F)+N
,A
7030 NEXT N: NEXT F
7040 DATA X,Y,Y,Y,Y,Y,Y,Y
7050 DATA X,0,0,0,0,0,0,0
7060 DATA X,1,1,1,1,1,1,1
7070 DATA Y,Y,Y,Y,Y,Y,Y,Y
7075 DATA 1,1,1,1,1,1,1,1
7080 DATA Y,Y,Y,Y,Y,Y,Y,X
7090 DATA 0,0,0,0,0,0,0,X
7100 DATA 1,1,1,1,1,1,1,X
7110 RETURN
7500 REM INSTRUCTIONS
7501 PAPER 7: INK 0: BORDER 7: B
RIGHT 1: CLS
7510 LET I$="(13*sp)OVERLOAD!(22
*sp)===========(41*sp)THE IDEA O
F THIS GAME IS TO GAINTOTAL DOMI
NATION OVER THE WHOLE BOARD BY '
OVERLOADING' CERTAIN  SECTORS."
7520 GO SUB 7750
7530 LET I$="THESE SECTORS ARE V
ERY VOLATILE AND IF FOUR OR MORE
 COUNTERS AREPLACED UPON ONE SEC
TOR IT WILL  EXPLODE SCATTERING
ITS CONTENTS OVER THE SURROUNDIN
G SECTORS."
7540 GO SUB 7750
7550 LET I$="(32*sp)YOU CAN ONLY
 PLACE YOUR COUNTER ON A EMPTY S
ECTOR OR ONE WITH   YOUR COLOUR
ON IT.": GO SUB 7750
7560 LET I$="PLAYER ONE IS RED..
.(12*sp)PLAYER TWO IS GREEN.": G
O SUB 7750
7570 FOR N=1 TO 2
7580 LET I$="PLAYER ": LET I$=I$
+STR$ N: LET I$=I$+" PLEASE ENTE
R YOUR NAME"
7590 GO SUB 7750
7600 INPUT A$(N)
7610 PRINT
7620 NEXT N
7740 RETURN
7750 FOR F=1 TO LEN I$
7760 PRINT I$(F);: BEEP .002,10
7770 NEXT F
7780 PRINT : RETURN
8000 CLS : REM SCREEN SET UP
8010 PRINT "(3*sp)1(2*sp)2(2*sp)
3(2*sp)4(2*sp)5(2*sp)6(2*sp)7(2*
sp)8(2*sp)9(sp)"
8020 FOR F=1 TO 6: PRINT "(2*sp)
ABCBBCBBCBBCBBCBBCBBCBBCBBC(sp)"
'F;"(sp)D0E(sp)0E(sp)0E(sp)0E(sp
)0E(sp)0E(sp)0E(sp)0E(sp)0E"
8030 PRINT "(2*sp)D(sp)E(2*sp)E(
2*sp)E(2*sp)E(2*sp)E(2*sp)E(2*sp
)E(2*sp)E(2*sp)E"
8040 NEXT F
8050 PRINT "(2*sp)BBBBBBBBBBBBBB
BBBBBBBBBBBBB"
8060 INK 7: LET P=1
8070 PRINT AT 2,3; PAPER 2;"1";A
T 17,27; PAPER 4;"1"
8080 LET A(1,1)=1: LET A(6,9)=1:
 LET B(1,1)=2: LET B(6,9)=4
8090 RETURN
8500 REM PLAYERS GO
8510 PRINT AT 21,0; INK 0;A$(P);
" X CO-ORD (ACROSS)"
8520 INPUT O
8530 IF O<=0 OR O>=10 OR O<>INT
O THEN  BEEP .1,0: GO TO 8520
8540 PRINT AT 21,0; INK 0;A$(P);
" Y CO-ORD (DOWN)  "
8550 INPUT D
8560 IF D<=0 OR D>=7 OR D<>INT D
 THEN  BEEP .1,0: GO TO 8550
8570 IF B(D,O)<>P*2 AND B(D,O)<>
0 THEN  PRINT )0;"ILLEGAL MOVE."
: BEEP .5,0: GO TO 8510
8580 LET B(D,O)=P*2: LET A(D,O)=
A(D,O)+1
8590 PRINT AT (D*3)-1,(O*3); PAP
ER B(D,O);A(D,O)
8600 IF P=1 THEN  LET P=2: RETUR
N
8610 LET P=1: RETURN
9000 REM SEARCH FOR BANG
9010 LET N=1: LET F=1
9020 IF A(N,F)<4 THEN  GO TO 920
1
9030 PRINT AT (N*3)-1,F*3; FLASH
 1;"*"
9040 IF N=1 THEN  GO TO 9080
9050 LET A((N-1),F)=A((N-1),F)+1
: LET A(N,F)=A(N,F)-1: BEEP .05,
6
9060 LET B((N-1),F)=B(N,F): PRIN
T AT ((N-1)*3)-1,F*3; PAPER B((N
-1),F);A((N-1),F)
9065 PRINT AT (N*3)-1,(F*3); PAP
ER B(N,F);A(N,F)
9070 IF A(N,F)=0 THEN  LET B(N,F
)=0: PRINT AT (N*3)-1,F*3; PAPER
 7; INK 0;"0": GO TO 9010
9080 IF N=6 THEN  GO TO 9120
9090 LET A((N+1),F)=A((N+1),F)+1
: LET A(N,F)=A(N,F)-1: BEEP .05,
6
9100 LET B((N+1),F)=B(N,F): PRIN
T AT ((N+1)*3)-1,F*3; PAPER B((N
+1),F);A((N+1),F)
9105 PRINT AT (N*3)-1,(F*3); PAP
ER B(N,F);A(N,F)
9110 IF A(N,F)=0 THEN  LET B(N,F
)=0: PRINT AT (N*3)-1,F*3; PAPER
 7; INK 0;"0": GO TO 9010
9120 IF F=1 THEN  GO TO 9160
9130 LET A(N,(F-1))=A(N,(F-1))+1
: LET A(N,F)=A(N,F)-1: BEEP .05,
6
9140 LET B(N,(F-1))=B(N,F): PRIN
T AT (N*3)-1,(F-1)*3; PAPER B(N,
(F-1));A(N,(F-1))
9145 PRINT AT (N*3)-1,(F*3); PAP
ER B(N,F);A(N,F)
9150 IF A(N,F)=0 THEN  LET B(N,F
)=0: PRINT AT (N*3)-1,F*3; PAPER
 7; INK 0;"0": GO TO 9010
9160 IF F=9 THEN  GO TO 9190
9170 LET A(N,(F+1))=A(N,(F+1))+1
: LET A(N,F)=A(N,F)-1: BEEP .05,
6
9180 LET B(N,(F+1))=B(N,F): PRIN
T AT (N*3)-1,(F+1)*3; PAPER B(N,
(F+1));A(N,(F+1))
9185 PRINT AT (N*3)-1,(F*3); PAP
ER B(N,F);A(N,F)
9190 IF A(N,F)=0 THEN  LET B(N,F
)=0: PRINT AT (N*3)-1,F*3; PAPER
 7; INK 0;"0": GO TO 9010
9195 GO TO 9040
9200 PRINT AT (N*3)-1,(F*3); PAP
ER B(N,F);A(N,F)
9201 LET F=F+1
9210 IF F>9 THEN  LET N=N+1: LET
 F=1
9220 IF N>6 THEN  GO TO 9240
9230 GO TO 9020
9240 REM CHECK FOR WIN
9250 LET T=0: LET U=0
9260 FOR F=1 TO 6: FOR N=1 TO 9
9270 IF B(F,N)=2 THEN  LET T=T+1
9280 IF B(F,N)=4 THEN  LET U=U+1
9290 NEXT N: NEXT F
9300 IF T=0 THEN  PRINT AT 21,0;
 INK 0; FLASH 1;"(3*sp)";A$(2);"
(sp)WINS!(8*sp)": FOR F=1 TO 10:
 BEEP .1,RND*20: NEXT F: PAUSE 1
00: GO TO 9900
9310 IF U=0 THEN  PRINT AT 21,0;
 INK 0; FLASH 1;"(3*sp)";A$(1);"
(sp)WINS!(8*sp)": FOR F=1 TO 10:
 BEEP .1,RND*20: NEXT F: PAUSE 1
00: GO TO 9900
9320 RETURN
9900 REM WIN ROUTINE
9910 PRINT AT 21,0; INK 0;"DO YO
U WISH TO RE-PLAY? (Y/N)"
9920 INPUT Q$
9930 IF Q$="N" OR Q$="n" THEN  S
TOP
9940 RUN
```

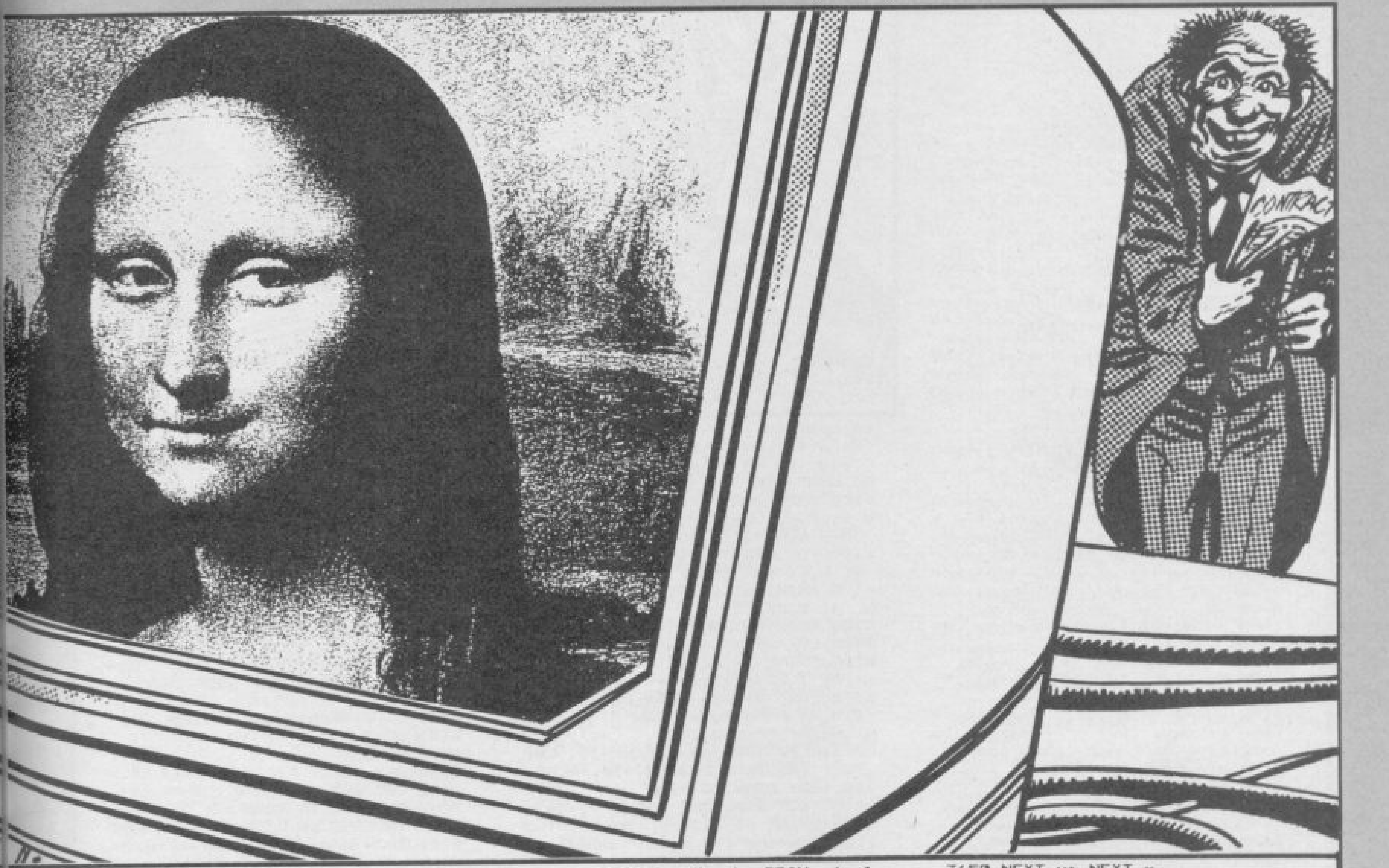
ADVANCED GRAPHICS can be created on the 48K Spectrum with **Power Paint** from Adrian Skilling of Tunbridge Wells, Kent.

Your designs can be transferred to an Epson FX-80 printer if you have printer driver software.

Read the instructions on the first page of Program Printout before entering the listing.




```
  10 REM "paintbox"
  20 BORDER 0: PAPER 0: INK 7
 100 REM VARIABLES
 101 CLS : INPUT "Would you like
 instructions ?",x$
 102 IF x$(1)="y" THEN  GO SUB 6
000
 110 LET a=4: LET b=151
 120 LET s=5
 130 LET m$="LAECTS": LET m=1
 140 LET c=7
 160 POKE USR "a",255: FOR x=1 T
O 6: POKE USR "a"+x,129: NEXT x:
 POKE USR "a"+7,255
 170 FOR z=0 TO 14 STEP 2: PRINT
 AT 0,z; INK z/2;"(ig8)": NEXT z
 180 PRINT AT 0,18;"5";AT 0,16;"
L";AT 0,20;"1"
 190 LET si=1
 200 LET e=0: LET d=0: LET h=0:
LET i=0: LET j=0: LET k=0
 210 LET f=0: LET g=0: LET l=0:
LET n=0
 220 INVERSE 0: PRINT AT 0,0; PA
PER 0; INK 7;"A";AT 0,22;"A"
 230 LET di=0
 240 LET n$="A"
 250 LET dr=2
1000 REM MAIN PROGRAM
1010 IF c=0 THEN  INVERSE 1
1020 OVER 1: PLOT a,b+1: PLOT a,
b+2: PLOT a,b-1: PLOT a,b-2: PLO
T a+1,b: PLOT a+2,b: PLOT a-1,b:
 PLOT a-2,b
1021 PLOT a,b+1: PLOT a,b+2: PLO
T a,b-1: PLOT a,b-2: PLOT a+1,b:
 PLOT a+2,b: PLOT a-1,b: PLOT a-
2,b: OVER 0
1025 INK c: INVERSE 0
1030 IF INKEY$="p" AND a<253-s T
HEN  LET a=a+s: GO TO 1200
1040 IF INKEY$="i" AND a>s+2 THE
N  LET a=a-s: GO TO 1200
1050 IF INKEY$="q" AND b<173-s T
HEN  LET b=b+s: GO TO 1200
1060 IF INKEY$="z" AND b>s+2 THE
N  LET b=b-s: GO TO 1200
1070 IF INKEY$="6" AND s>1 THEN
 LET s=s-1: PRINT AT 0,18;s
1080 IF INKEY$="7" AND s<5 THEN
 LET s=s+1: PRINT AT 0,18;s
1090 IF INKEY$="n" THEN  GO SUB
2510
1100 IF INKEY$="5" AND si>0 THEN
  LET si=si-1: PRINT AT 0,20;si:
 GO TO 1200
1110 IF INKEY$="8" AND si<9 THEN
  LET si=si+1: PRINT AT 0,20;si:
 GO TO 1200
1120 IF INKEY$="c" THEN  GO TO 4
000
1130 IF INKEY$="B" THEN  GO SUB
4100
1140 IF INKEY$="S" THEN  GO SUB
6400
1150 IF INKEY$="P" THEN  GO SUB
7000
1200 IF b>159 THEN  GO TO 2010
1210 PRINT AT 0,25;"X=";b;"(2*sp
)";AT 1,25;"Y=";a;"(2*sp)"
1950 IF m$(m)<>"D" THEN  PRINT A
T 0,20;si
1955 IF m$(m)="E" AND l<>0 THEN
 GO SUB 2996
1960 IF m$(m)="D" THEN  GO SUB 3
570
1970 IF m$(m)="S" AND l<>0 THEN
 GO SUB 3400
1980 IF m$(m)="T" AND h<>0 AND j
<>0 THEN  GO SUB 3200
1990 IF m$(m)="L" AND e<>0 THEN
 GO SUB 2800
1999 IF m$(m)="F" AND l<>0 THEN
 GO SUB 3700
2000 GO TO 1000
2010 REM CHOOSE
2011 LET a=4
2012 LET b=161
2020 OVER 1: PLOT a,b+1: PLOT a,
b+2: PLOT a,b-1: PLOT a,b-2: PLO
T a+1,b: PLOT a+2,b: PLOT a-1,b:
 PLOT a-2,b
2030 OVER 1: PLOT a,b+1: PLOT a,
b+2: PLOT a,b-1: PLOT a,b-2: PLO
T a+1,b: PLOT a+2,b: PLOT a-1,b:
 PLOT a-2,b
2035 OVER 0
2036 INK 7
2040 IF INKEY$="p" AND a<244 THE
N  LET a=a+16
2050 IF INKEY$*"i" AND a>16 THEN
  LET a=a-16
2060 IF INKEY$="z" THEN  LET b=b
-10: GO TO 1000
2070 IF INKEY$="n" AND a<132 THE
N  LET c=INT (a/16)
2080 IF INKEY$="n" AND a=132 THE
N  LET m=m+1: IF m>6 THEN  LET m
=1
2090 PRINT AT 0,16;m$(m)
2100 IF INKEY$="n" AND a=180 AND
 n$="A" THEN  LET n$="(ig8)": PR
INT AT 0,22;"(ig8)": GO TO 2020
2110 IF INKEY$="n" AND a=180 AND
 n$="(ig8)" THEN  LET n$="A": PR
INT AT 0,22;"A"
2500 GO TO 2020
2510 REM ACTION
2511 INK c
2512 IF c=0 THEN  INVERSE 1: INK
 7
2520 IF m$(m)="A" THEN  GO TO 26
00
2530 IF m$(m)="L" THEN  GO TO 27
00
2540 IF m$(m)="E" THEN  GO TO 29
00
2550 IF m$(m)="C" THEN  GO TO 30
00
2560 IF m$(m)="T" THEN  GO TO 31
00
2570 IF m$(m)="S" THEN  GO TO 33
00
2580 IF m$(m)="P" THEN  GO TO 35
00
2585 IF m$(m)="D" THEN  GO TO 35
40
2590 IF m$(m)="F" THEN  GO TO 36
00
2599 RETURN
2600 REM AIRBRUSH
2610 IF a<=si OR a>=255-si OR b>
=175-si OR b<=si THEN  RETURN
2620 FOR x=1 TO 3
2630 LET y=INT (RND*(si*2)-si)
2635 LET z=INT (RND*(si*2)-si)
2640 PLOT y+a,z+b
2650 NEXT x
2699 RETURN
2700 REM LINE
2710 IF INKEY$="n" AND e=0 THEN
 LET e=a: LET d=b: RETURN
2720 IF INKEY$="n" THEN  PLOT e,
d: DRAW a-e,b-d: LET e=0: LET d=
0: RETURN
2799 RETURN
2800 REM DRAW LINE
2810 OVER 1: PLOT e,d: DRAW a-e,
b-d: PLOT e,d: DRAW a-e,b-d: OVE
R 0: PLOT e,d
2820 RETURN
2900 REM ERASE
2910 OVER 0: IF l=0 THEN  LET l=
a: LET n=b: BEEP .1,15: RETURN
2911 INVERSE 1
2912 IF l<a THEN  LET x=1
2913 IF l>a THEN  LET x=-1
2920 FOR v=1 TO a STEP x: PLOT v
,n: DRAW 0,(b-n)
2925 IF v=a THEN  GO TO 2930
2928 NEXT v
2930 INVERSE 0: LET l=0: LET n=0
2995 RETURN
2996 REM ERASE 1
2997 INVERSE 0: OVER 1: PLOT l,n
: DRAW 0,b-n: DRAW a-l,0: DRAW 0
```




```
,-(b-n): DRAW -(a-1),0
2998 PLOT l,n: DRAW 0,b-n: DRAW
a-1,0: DRAW 0,-(b-n): DRAW -(a-1
),0: INVERSE 0: OVER 0
2999 RETURN
3000 REM CIRCLE
3010 IF f=0 THEN  LET f=a: LET g
=b: PLOT f,g: BEEP .1,10: RETURN

3020 LET z=a-f: LET x=b-g
3030 LET z=ABS z: LET x=ABS x
3040 IF x=0 AND z>0 THEN  LET di
=z: GO TO 3060
3050 IF z=0 AND x>0 THEN  LET di
=x: GO TO 3060
3055 RETURN
3070 IF f-di<0 OR f+di>255 OR g-
di<0 OR g+di>160 THEN  BEEP .1,0
: INVERSE 1: PLOT f,g: INVERSE 0
: LET f=0: LET g=0: RETURN
3080 CIRCLE f,g,di
3081 IF n$="(ig8)" THEN  FOR x=1
 TO di: OVER 1: CIRCLE f,g,x: OV
ER 0: NEXT x
3090 INVERSE 0
3091 LET f=0: LET g=0
3099 RETURN
3100 REM TRIANGLE
3110 IF h=0 THEN  LET h=a: LET i
=b: PLOT h,b: BEEP .1,10: RETURN

3120 IF h<>0 AND j=0 THEN  LET j
=a: LET k=b: PLOT h,i: DRAW j-h,
k-i: BEEP .1,10: RETURN
3130 PLOT h,i: DRAW a-h,b-i: DRA
W j-a,k-b
3139 LET h=0: LET i=0: LET j=0:
LET k=0
3140 RETURN
3200 REM DRAW TRIANGLE
3210 OVER 1: PLOT h,i: DRAW a-h,
b-i: DRAW j-a,k-b
3220 PLOT h,i: DRAW a-h,b-i: DRA
W j-a,k-b: OVER 0
3290 RETURN
3300 REM SQUARE
3310 IF l=0 THEN  LET l=a: LET n
=b: RETURN
3320 PLOT l,n: DRAW 0,b-n: DRAW
a-1,0: DRAW 0,-(b-n): DRAW -(a-1
),0
3325 IF n$="A" THEN  GO TO 3380
3326 LET v=1
3327 IF a<v THEN  LET v=v-1
3328 IF a>v THEN  LET v=v+1
3330 PLOT v,n: DRAW 0,b-n
3332 IF v=a THEN  GO TO 3380
3333 GO TO 3327
3380 LET l=0: LET n=0
3399 RETURN
3400 REM DRAW SQUARE
3410 OVER 1: PLOT l,n: DRAW 0,b-
n: DRAW a-1,0: DRAW 0,-(b-n): DR
AW -(a-1),0
3420 PLOT l,n: DRAW 0,b-n: DRAW
a-1,0: DRAW 0,-(b-n): DRAW -(a-1
),0: OVER 0
3430 RETURN
3500 REM PIXEL
3510 IF n$="A" THEN  INVERSE 1:
PLOT a,b: INVERSE 0: RETURN
3520 IF n$="(ig8)" THEN  PLOT a,
b: INVERSE 0: RETURN
3530 RETURN
3540 REM DRAW
3550 IF dr=0 THEN  LET dr=1: GO
TO 3570
3555 IF dr=1 THEN  LET dr=2: GO
TO 3570
3560 IF dr=2 THEN  LET dr=0: GO
TO 3570
3570 PRINT AT 0,20;dr
3571 IF dr=2 THEN  RETURN
3580 IF dr=0 THEN  INVERSE 0: PL
OT a,b: INVERSE 0
3590 IF dr=1 THEN  INVERSE 1: PL
OT a,b: INVERSE 0
3599 RETURN
3600 REM FILL
3610 IF l=0 THEN  LET l=a: LET n
=b: RETURN
3630 LET k=1: FOR x=l TO l+(a-l)
 STEP (l<l+(a-l))-(l>l+(a-l))
3635 FOR y=n TO n+(b-n) STEP (n<
n+(b-n))-(n>n+(b-n))
3640 IF POINT (x,y)=1 THEN  LET
k=1-k
3645 IF k<1 THEN  PLOT x,y
3650 NEXT y: NEXT x
3660 LET l=0: LET n=0
3699 RETURN
3700 REM DRAW FILL SQUARE
3710 OVER 1: PLOT l,n: DRAW 0,b-
n: DRAW a-1,0: DRAW 0,-(b-n): DR
AW -(a-1),0
3720 PLOT l,n: DRAW 0,b-n: DRAW
a-1,0: DRAW 0,-(b-n): DRAW -(a-1
),0: OVER 0
3730 RETURN
4000 REM PRINT ONTO PRINTER
4001 OVER 0
4010 PRINT AT 0,0;"Do you have p
rinter software";AT 1,24;"LOADED
"
4020 INPUT "(yes or no) ";x$
4030 IF x$<>"yes" THEN  GO TO 10
0
4040 PRINT AT 0,0;"(32*sp)";AT 1
,24;"(6*sp)"
4060 INPUT "input name ? ";z$: I
F LEN z$>15 THEN  GO TO 4010
4070 PRINT AT 0,0;"Would you lik
e 1.black on white";AT 1,16;"2.W
hite on black"
4071 INPUT x$: IF x$(1)<>"1" AND
 x$(1)<>"2" THEN  GO TO 4071
4072 IF x$(1)="1" THEN  GO TO 40
80
4075 PRINT AT 0,0;"(32*sp)";AT 1
,16;"(16*sp)";AT 0,10;z$
4076 FOR x=0 TO 175: OVER 1: PLO
T 0,x: DRAW 255,0: NEXT x: OVER
0
4080 IF x$(1)="1" THEN  PRINT AT
 0,0;"(32*sp)";AT 1,16;"(16*sp)"
;AT 0,10;z$
4090 RANDOMIZE USR 23296
4099 STOP
4100 REM MEMORIZE
4120 FOR s=1 TO 4650
4130 LET r(s)=PEEK 16383+s
4140 NEXT s
4360 PRINT AT 0,10;"THE END": BE
EP 1,0: PAUSE 0
5000 REM PRINT DISPLAY
5001 CLS
```

continued on page 114

continued from page 113

```
5010 FOR s=1 TO 4650
5020 POKE 16383+s,r(s)
5030 NEXT s
5050 STOP
6000 REM INSTRUCTIONS
6010 PRINT AT 0,5;"Painter"
6020 PRINT AT 1,5;"_______"
6030 PRINT AT 3,0;"  The main ke
ys for painter      are :-
                         I-left
                         P-righ
t                        Q-up
                         Z-down
"
6040 PRINT AT 11,0;"  Some other
 keys are :-          N-invoke com
mand                  5-move airbr
ush size down         8-move airbr
ush size up           6-make speed
 of cursor go down  7-make speed
 of cursor go up       "
6050 GO SUB 6300
6060 PRINT AT 1,1;"changing colo
ur and commands";AT 2,1;"_______
_____________________"
6070 PRINT AT 4,0;"  To change a
 colour move to the top of the s
creen by pressing   (Q) .Then mo
ve along the top of the screen b
y pressing (I) or  (P), then pre
ss (N) to change  colour or com
mand ."
6080 PRINT AT 11,10;"Drawing com
mands";AT 12,10;"_______________
_"
6090 PRINT AT 14,10;"Circles";AT
 15,10;"_______"
6100 PRINT AT 17,0;"  Drawing ci
cles is easy .      Press (N) to
 position centre    then press (
N) again to position"
6110 GO SUB 6300
6120 PRINT AT 1,0;"  a point on
the outside of the circle ."
6130 PRINT AT 4,10;"Squares";AT
5,10;"_______"
6140 PRINT AT 7,0;"  Press (N) t
o position one      corner of the
 square the use     the normal ke
ys to stretch it . Then press (N
) again to finish"
6150 PRINT AT 12,10;"Airbrush";A
T 13,10;"________"
6160 PRINT AT 15,0;"  Press (N)
```




```
to operate            airbrush and
 keys (5) to make    spray smalle
r and (8) to make    it larger":
GO SUB 6300
6170 POKE USR "a",255: FOR x=1 T
O 6: POKE USR "a"+x,129: NEXT x:
 POKE USR "a"+7,255
6180 FOR z=0 TO 14 STEP 2: PRINT
 AT 0,z; INK z/2;"(ig8)": NEXT z
6190 PRINT AT 0,18;"5";AT 0,16;"
L";AT 0,20;"1"
6200 PRINT AT 0,0;"A"
6205 LET a=4: LET b=151
6210 PRINT AT 0,25;"X=";b;"(2*sp
)";AT 1,25;"Y=";a;"(2*sp)"
6220 PLOT 0,160: DRAW 0,-3: DRAW
 120,0: DRAW 0,3: DRAW 0,-3: DRA
W -60,0: DRAW 0,-10
6230 PLOT 130,160: DRAW -10,-20:
 PLOT 146,160: DRAW 0,-30: PLOT
168,160: DRAW 10,-20
6240 PLOT 210,155: DRAW -4,-50
6250 PRINT AT 3,3;"Colours";AT 5
,10;"Command";AT 6,15;"Speed";AT
 7,15;"of";AT 8,15;"Cursor"
6260 PRINT AT 5,21;"Size";AT 6,2
1;"of";AT 7,21;"Airbrush";AT 9,2
2;"Position";AT 10,22;"of";AT 11
,22;"Cursor"
6270 GO TO 6300
6299 STOP
6300 PRINT AT 21,0; FLASH 1;"PRE
SS ANY KEY TO CONTINUE": PAUSE 0
: CLS : FLASH 0: RETURN
6399 STOP
6400 REM SAVE PICTURE
6410 LET y=0: LET w=0
6450 FOR x=1 TO 4000
6460 FOR v=w+1 TO 255
6470 IF POINT (v,y)=1 THEN  LET
r(x)=r(x)+1
6480 NEXT v
6485 LET x=x+1
6490 FOR w=v+1 TO 255
6500 IF POINT (w,y)=0 THEN  LET
r(x)=r(x)+1
6510 NEXT w
6520 IF w>=255 THEN  LET y=y+1:
LET w=0
6521 IF y>=160 THEN  RETURN
6530 NEXT x
6999 RETURN
7000 REM PRINT PICTURE
7010 LET y=0: LET w=0
7050 FOR x=1 TO 4000
7060 INVERSE 1: PLOT 0,y: INVERS
E 0: DRAW r(x),0: LET w=w+r(x)
7070 LET x=x+1
7080 INVERSE 1: DRAW r(x),0: LET
 w=w+r(x): INVERSE 0
7090 IF w>=255 THEN  LET y=y+1
7100 IF y>=160 THEN  RETURN
7130 NEXT x
7999 RETURN
9998 STOP
9999 SAVE "painter"
```

YOUR GLOVES are on and you're ready to go in this game for the 48K Spectrum by H R Davies of Mid Glamorgan, South Wales.

Your opponent shuffles warily, but eagerly, before you in the brightly lit ring. He is waiting for you to throw the first punch. Go on the attack but don't let your guard down. If your concentration drops for even a second you could be on the floor and out for the count.

***Body Blow** uses our special abbreviations for graphics characters. Please read the instructions on the first page of Program Printout before typing in the program.*




```
   2 REM "HEAVYWEIGHT"
   3 FOR N=1 TO 10: BEEP .05,N*2
: NEXT N
   5 PRINT '''" TO PUNCH PRESS C
ORRESPONDING                KEY (
2-6)"''          PRESS 1 TO BLOCK"
   6 PRINT '''" THE HIGHER THE N
UMBER THE LESS  CHANCE OF HITTIN
G OPPONENT BUT  THE MORE IT WEAK
ENS HIM IF THE          PUNCH DOES
GET THROUGH"
   8 PRINT AT 17,10;"PLEASE WAIT
"
   9 POKE 23658,8
  10 BORDER 2
  20 DIM a$(6,10)
  30 FOR n=1 TO 6: READ a$(n): N
EXT n
  40 DATA "BLOCK(5*sp)","LEFT JA
B(2*sp)","RIGHT JAB(sp)","LEFT H
OOK(sp)","UPPER CUT(sp)","RIGHT
HOOK"
  45 GO SUB 9000
  50 LET KD=0: LET YR=1980: LET
F=0: LET KO=0: LET FL=0: LET FW=
0: LET FS=0
 100 LET HELD=0: LET TITLE=0: LE
T Q=2: LET H=150: LET WR=150: LE
T O=0: LET AGE=16+INT (RND*5): L
ET L=1: LET STR=80+INT (RND*70)
 105 PRINT AT 21,2; FLASH 1;"
PRESS ANY KEY TO PLAY    ": PAUSE
 0
 110 GO TO 4000
 120 IF F$="F" THEN  GO TO 5000
 125 IF F$="Y" OR wr=1 THEN  LET
 F=F+1
 130 IF TITLE=1 THEN  PRINT AT 1
,7;"WORLD TITLE FIGHT"
 150 GO SUB 6000
 500 PRINT AT 17,0; INVERSE 1;,,
"(3*sp)BLOCK(6*sp)1","LEFT HOOK(
2*sp)4","(3*sp)LEFT JAB(3*sp)2",
"UPPER CUT(2*sp)5","(3*sp)RIGHT
JAB(2*sp)3","RIGHT HOOK 6",,,
 850 LET U=0: LET E=0: LET EP=0:
 LET UP=0
 900 FOR R=1 TO 10
```

```
 903 LET OP=OP+6: LET PHS=PHS+6
 905 LET U=U+UP: LET E=E+EP
 910 LET EP=0: LET UP=0
 950 PRINT AT 6,12; INK 2;"(ig5,
8*sp,g5)";AT 7,12;"(10*ig8)"
 960 PRINT AT 6,16;"B";AT 5,16;"
A";AT 6,17;"H";AT 5,17;"G"
 990 FOR M=1 TO 5
1000 PRINT AT 2,13;"ROUND:";R;AT
 12,2;"ENERGY :";PHS;"(sp)","(3*
sp)ENERGY :";OP;"(sp)"
1050 PAUSE 0: LET Z$=INKEY$: FOR
 N=49 TO 54: IF CHR$ CODE Z$=CHR
$ N THEN  GO TO 1052
1051 NEXT N: GO TO 1050
1052 LET A=VAL Z$: BEEP .1,8: GO
 SUB 7000
1060 PRINT AT 12,27;OP;"(sp)";AT
 12,10;PHS;"(sp)"
3000 NEXT M
3002 IF M=6 THEN  FOR N=1 TO 15:
 BEEP .02,30-N: NEXT N
3005 FOR N=1 TO 3: PRINT AT 5,16
-N;"G(sp)";AT 6,16-N;"H(sp)";AT
5,16+N;"(sp)A";AT 6,16+N;"(sp)B"
: PAUSE 20: NEXT N
3008 FOR N=1 TO 3: PRINT AT 5,20
-N;"G(sp)";AT 6,20-N;"H(sp)";AT
5,12+N;"(sp)A";AT 6,12+N;"(sp)B"
: PAUSE 20: NEXT N
3010 NEXT R
3020 GO TO 3500
3100 PRINT AT 5,16;"C(sp)";AT 6,
17;"KL": LET KD=KD+1
3101 FOR N=1 TO 9: LET OP=OP-(2
AND OP>0): PRINT AT 5,22;N;AT 12
,27;OP;"(sp)": BEEP .5,N: PRINT
AT 5,22;"(3*sp)"
3102 IF RND*((OP/2)+10)>RND*50+U
P-10 THEN  PRINT AT 6,17;"H(sp)"
: RETURN
3103 NEXT N
3104 PRINT AT 5,22;10;AT 8,7;"YO
U WIN BY KNOCKOUT": LET L=L+1: L
ET KO=KO+1: LET FW=FW+1: LET WR=
WR-INT ((RND*40)+L): IF TITLE=1
THEN  LET Q=1
3105 GO TO 3600
3110 PRINT AT 5,16;"(sp)I";AT 6,
15;"MN"
3112 FOR N=1 TO 9: LET PHS=PHS-(
2 AND PHS>0): PRINT AT 5,11;N;AT
 12,10;PHS;"(2*sp)": BEEP .5,N:
PRINT AT 5,11;"(2*sp)"
3113 IF RND*((PHS/2)+10)>RND*50+
EP-10 THEN  PRINT AT 6,15;"(sp)B
": RETURN
3115 NEXT N
3120 PRINT AT 5,11;10;AT 8,7;"YO
U LOSE BY KNOCKOUT": LET L=L-2:
LET FL=FL+1: LET STR=STR-INT (RN
D*20): LET WR=WR+INT ((RND*20)+L
/1.5): LET Q=0: LET TITLE=0
3200 GO TO 3600
3500 PRINT AT 8,15;"DRAW"
3505 IF E>U+5 THEN  PRINT AT 8,1
3;"YOU LOSE ": LET FL=FL+1: LET
L=L-1: LET WR=WR+INT (RND*20)-L/
3: LET Q=0: LET TITLE=0
3510 IF U>E+5 THEN  PRINT AT 8,1
3;"YOU WIN ": LET FW=FW+1: LET L
=L+1: LET WR=WR-INT ((RND*20)+L/
2): IF TITLE=1 THEN  LET Q=1
3520 IF OP<=0 THEN  PRINT AT 8,6
;"YOU WIN FIGHT STOPPED ": LET F
S=FS+1: LET FW=FW+1: LET L=L+1:
LET WR=WR-INT ((RND*30)+L): IF T
ITLE=1 THEN  LET Q=1
3530 IF PHS<=0 THEN  PRINT AT 8,
6;"YOU LOSE FIGHT STOPPED ": LET
 FL=FL+1: LET L=L-2: LET WR=WR+I
NT ((RND*23)+L/1.5): LET Q=0: LE
T TITLE=0
3600 IF WR<2 AND Q<>1 THEN  LET
WR=2: LET TITLE=1
3700 IF TITLE=1 AND Q=1 THEN  LE
T WR=1
4000 PAUSE 100: CLS
4005 GO SUB 6000
4008 IF L<1 THEN  LET L=1
4009 IF L>10 THEN  LET L=10
4010 PRINT AT 2,12;"YEAR ";YR
4020 PRINT AT 6,3;"AGE ";AGE
4030 PRINT AT 8,3;"PHYSICAL STAT
E ";STR;" "
4035 PRINT AT 11,3;"WORLD RATING
 ": IF WR>=101 THEN  PRINT AT 11
,23;"?"
4036 IF WR<H THEN  LET H=WR
4037 IF WR<=100 THEN  PRINT AT 1
1,23;INT WR
4038 IF WR=1 THEN  LET HELD=HELD
+3
4040 IF RND>.6 THEN  LET STR=STR
+INT (RND*11)-4
4050 LET O=O+1: IF O=4 THEN  LET
 AGE=AGE+1: LET YR=YR+1: LET STR
=STR-INT (RND*(AGE-25)): LET O=0
4055 LET OS=INT (RND*6)+1: LET P
HS=STR: LET OP=INT (30+(RND*20)+
(10*L))
4060 IF RND>.7 THEN  PRINT AT 15
,10;" OPPONENT ";OP;"(sp)": INPU
T "FIGHT?(Y=YES,F=FIGHT RECORD)"
;F$: IF F$="Y" OR F$="F" OR WR=1
 THEN  CLS : GO TO 120
4100 GO TO 4010
5000 GO SUB 6000
5010 PRINT AT 2,3;"HIGHEST RATIN
G ACHIEVED  ?"
5050 IF H<=100 THEN  PRINT AT 1,
28;INT H
5110 PRINT AT 6,3;"NUMBER OF FIG
HTS ";F
5120 PRINT AT 8,3;"LOST ";FL;"
 WON ";FW;"   DREW ";F-(FL+FW)
5130 PRINT AT 12,3;"KNOCKOUTS ";
KO;,"KNOCKDOWNS ";KD;AT 13,3;"ST
OPPED   ";FS
5140 INPUT "R=RETIRE C=CONTINUE"
;F$
5145 IF F$="R" THEN  GO TO 5200
5150 IF F$="C" THEN  GO TO 4000
5170 GO TO 5140
5200 PAUSE 100: RUN
6000 FOR N=0 TO 31: PRINT AT 0,N
; PAPER 0;"O": NEXT N
6005 FOR N=0 TO 31: PRINT AT 21,
N; PAPER 0;"O": NEXT N
6010 FOR N=0 TO 21: PRINT AT N,0
; PAPER 0;"O": NEXT N
6020 FOR N=0 TO 21: PRINT AT N,3
1; PAPER 0;"O": NEXT N
6040 FOR N=0 TO 18: PRINT AT N,3
1; PAPER 0;"O": NEXT N
6050 PLOT 0,144: DRAW 255,0
6100 RETURN
7000 LET OA=INT (RND*6)+1
7010 IF RND<.4 THEN  LET OA=OS+I
NT (RND*3)-1: IF OA>6 THEN  LET
OA=6
7020 IF OA<1 THEN  LET OA=1
7030 PRINT AT 10,3;A$(A);AT 10,2
1;A$(OA)
7040 IF A=1 THEN  GO TO 7060
7050 IF (RND*13)+(3 AND OA=1)<(6
-A)+(RND*13) THEN  LET OP=OP-A:
LET UP=UP+A: PRINT AT 5,16;"C":
PAUSE 1: PRINT AT 5,16;"DJ";AT 4
,17;"*": BEEP .2,-20
7055 IF UP>=RND*10+10 THEN  PRIN
T AT 4,16;"(2*sp)": GO SUB 3100
7058 PRINT AT 5,22;"(2*sp)"
7059 PRINT AT 4,16;"(2*sp)"
7060 IF OA=1 THEN  GO TO 7110
7070 IF (RND*13)+(3 AND A=1)<(6-
OA)+(RND*13) THEN  LET PHS=PHS-O
A: LET EP=EP+OA: PRINT AT 5,17;"
I": PAUSE 1: PRINT AT 5,16;"EF";
AT 4,16;"*": BEEP .2,-20
7080 IF EP>=RND*10+10 THEN  PRIN
T AT 4,16;"(2*sp)": GO SUB 3110
7100 PRINT AT 5,11;"(2*sp)"
7105 PRINT AT 4,16;"(2*sp)"
7110 PRINT AT 5,16;"AG";AT 6,15;
"(sp)BH "
7115 IF OP<0 THEN  LET OP=0
7117 IF PHS<0 THEN  LET PHS=0
7120 IF OP<=0 OR PHS<=0 THEN  IF
 RND>.7 THEN  GO TO 3520
7999 RETURN
9000 FOR N=USR "A" TO USR "N"+7
9010 READ G: POKE N,G: NEXT N
9020 DATA 24,28,24,32,102,118,10
4,96
9030 DATA 96,112,112,80,72,132,1
32,198
9040 DATA 24,28,24,35,115,108,96
,96
9050 DATA 12,14,12,16,63,48,96,9
6
9060 DATA 208,230,102,17,48,112,
107,103
9070 DATA 48,112,48,8,252,12,6,6
9080 DATA 24,56,24,4,102,110,22,
6
9090 DATA 6,14,14,10,18,33,33,99
9100 DATA 24,56,24,196,206,54,6,
6
9110 DATA 11,103,102,136,12,14,2
14,230
9120 DATA 0,0,0,0,4,10,145,255
9130 DATA 0,0,0,48,48,66,247,255
9140 DATA 0,0,0,6,6,65,239,255
9150 DATA 0,0,0,0,32,80,137,255
9200 RETURN
9999 SAVE "HEAVY WGT" LINE 1
```





IT'S SHOOT EM UP time again, with another machine-code marvel for the 48K Spectrum or Spectrum Plus. This time the aliens come in splendid 3D style graphics, and you simply have to hit as many as you can, screen after screen after screen . . .

Use keys Q, S, P and L to move and Symbol Shift to fire — or plug in a Kempston joystick, if you prefer. **Fire Kracker** comes from J E Hutchinson of Bradford, Yorkshire, and despite the simplicity of the concept, it's a lovely game. Get zapping — but don't hit the Shooter or the Bougz. If you can work out what they are . . .

The program uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout before typing in the listing.

```
   1 LET hi=VAL "500": LET hist=
VAL "0": LET h$="Andrew Kay": GO
 SUB VAL "1000"
   2 POKE VAL "57602",VAL "9": P
OKE 57603,VAL "0": LET str=VAL "
0": BORDER VAL "2": INK VAL "0":
 PAPER VAL "6": BRIGHT VAL "1":
CLS : FOR x=VAL "0" TO VAL "5":
PRINT  PAPER VAL "2"; BRIGHT VAL
 "0";"(32*sp)": NEXT x: PRINT AT
 VAL "2",VAL "10";"FIRE KRACKER"
   3 PRINT #1;TAB VAL "3"; BRIGH
T VAL "1"; PAPER VAL "6"; INK VA
L "0";"WRITTEN BY J.E.HUTCHINSON"
   4 PRINT AT VAL "10",VAL "0";
PAPER VAL "5";"(38*sp)1(2*sp)KEM
PSTON JOYSTICK(44*sp)2(2*sp)KEYB
OARD(47*sp)"
   5 PRINT AT VAL "17",VAL "3";
PAPER VAL "5";"HIGH SCORE FROM "
;h$: PRINT AT VAL "19",VAL "6";
PAPER VAL "5";"SCORE ";hi;"(4*sp
)STARS(sp)";hist
   7 LET k$=INKEY$: IF k$="" THE
N  GO TO VAL "5"
   8 IF k$<"1" OR k$>"2" THEN  G
O TO VAL "5"
   9 IF k$="1" THEN  POKE VAL "5
7466",VAL "255"
  10 IF k$="2" THEN  POKE VAL "5
7466",VAL "0"
  11 BORDER VAL "0": FOR x=VAL "
0" TO VAL "21": PRINT AT x,VAL "
0"; PAPER VAL "0"; INK VAL "6";"
(32*sp)": BEEP .005,x: NEXT x
  20 BORDER VAL "0": PAPER VAL "
0": INK VAL "6": BRIGHT VAL "1":
 CLS
  21 RANDOMIZE USR VAL "50000"
  22 IF PEEK 57602=0 THEN  GO TO
 VAL "120"
  23 IF PEEK VAL "57603"=VAL "10
0" THEN  LET str=str+VAL "1": PO
KE VAL "57602",VAL "9": POKE VAL
 "57603",VAL "0"
  30 POKE VAL "23606",VAL "0": P
OKE VAL "23607",VAL "60": GO SUB
 VAL "140": RANDOMIZE USR VAL "5
0219": GO TO VAL "22"
 120 POKE VAL "23606",VAL "0": P
OKE VAL "23607",VAL "60": CLS :
GO SUB VAL "140": PRINT AT VAL "
10",VAL "12"; PAPER VAL "6"; INK
 VAL "0";"GAME OVER"
 125 RANDOMIZE USR VAL "51469"
 130 IF str>hist THEN  GO TO VAL
 "134"
 131 IF str=hist AND PEEK (VAL "
57603")*VAL "10">hi THEN  GO TO
VAL "134"
 133 GO TO VAL "2"
 134 CLS : PRINT "  YOU HAVE GAI
NED A WHOPPER OF  A SCORE AND SO
 YOU MAY ENTER    YOUR NAME FOR
THE RECORD BOOK"
 135 INPUT AT VAL "15",VAL "10";
AT VAL "0",VAL "0";"NAME : "; LI
NE h$
 136 IF LEN h$>VAL "10" THEN  PR
INT #1;"NAME TOO LONG!": PAUSE V
AL "30": GO TO VAL "133"
 137 LET hi=PEEK (VAL "57603")*V
AL "10": LET hist=str
 139 GO TO VAL "2"
 140 BEEP .01,-10: PRINT AT 21,0
; PAPER 5; INK 0;"SCORE ";PEEK (
57603)*10: PRINT AT 21,13; PAPER
 5; INK 0;"STARS ";str: PRINT AT
 21,23; PAPER 5; INK 0;"LIVES ";
PEEK 57602
 150 RETURN
1000 CLS : PRINT AT VAL "10",VAL
 "5"; PAPER VAL "7"; INK VAL "2"
; FLASH VAL "1";"PLEASE WAIT 50
SECONDS"
1010 RESTORE VAL "1030": LET d$=
"ONE": LET c=VAL "0": FOR x=VAL
"55000" TO VAL "55074": READ a:
LET c=c+a: POKE x,a: NEXT x: IF
c<>VAL "6595" THEN  GO TO 1200
1030 DATA 7,4,11,9,15,14,19,11,2
3,8,200,2,255,200,2,255,200,2,25
5,50,3,70,100,3,70,200,3,100,110
,2,255,110,2,100,200,2,255,200,2
,200,200,3,70,100,3,30,100,3,30,
50,3,200,110,2,255,200,2,255,200
,2,100,200,3,70,110,3,70,200,3,1
50,80,4,255,0,0
1045 RESTORE VAL "1060": LET d$=
"TWO": LET c=VAL "0": FOR x=VAL
"62000" TO VAL "62900": READ a:
LET c=c+a: POKE x,a: NEXT x: IF
c<>VAL "96535" THEN  GO TO 1200
1060 DATA 1,7,31,127,143,241,254
,255,128,240,254,249,231,159,127
,127,255,127,79,81,22,3,5,0,126,
120,98,154,104,128,64,0,2,1,1,51
,31,14,29,58,8,16,176,189,191,22
8,148,78,125,109,155,20,83,118,6
0,0,187,176,24,253,230,112,16,32
,0,0,0,0,2,1,1,7,0,0,0,0,0,24,23
6,96,1,11,7,1,0,0,0,0,24,36,168,
224,144,128,0,0,2,1,0,1,1,3,6,3
1062 DATA 64,128,128,128,128,192
,32,192,3,1,5,29,59,123,119,63,1
92,0,160,184,220,222,238,252,95,
39,80,42,85,42,21,10,250,230,30,
238,94,236,88,160,1,1,1,1,1,3,2,
3,0,128,0,128,128,128,128,128,3,
1,5,29,59,123,119,63,128,0,160,1
84,220,222,238,252,95,39,80,42,8
5,42,21,10,250,230,30,254,94,252
,120,160,0,0,0,1,1,6,15,29,128,1
28,128,192,192,112,248,252,25,51
1064 DATA 51,51,57,31,15,0,252,2
54,254,254,254,252,248,0,15,15,1
4,22,58,124,120,112,248,248,56,1
80,174,159,143,135,0,0,0,1,1,6,1
5,29,128,128,128,192,192,112,248
,252,25,51,51,51,57,31,15,0,252,
254,254,254,254,252,248,0,15,7,1
1,13,14,30,28,24,248,216,168,116
,234,170,106,58,3,15,28,56,56,11
3,113,57,192,240,120,252,252,254
,254,252,79,113,126,115,113,113,
113,113,242,142,126,254,238,214
1066 DATA 214,214,113,113,113,11
3,113,57,15,1,238,254,238,198,23
8,252,240,128,3,15,28,56,56,113,
113,57,192,240,120,252,252,254,2
54,252,79,113,126,115,121,101,10
1,101,242,142,126,254,254,254,25
4,254,121,113,121,109,121,57,15,
1,254,254,254,254,254,252,240,12
8,0,0,3,15,28,39,56,127,0,0,0,22
4,240,184,220,124,127,127,115,97
,96,96,99,119,182,214,222,234,23
4,238,106,106,118,120,124,63,63,
31,15,3,110,110,238,236,242,232,
208,160,0,0,3,15,30,39,56,127,0,
0,0,224
1068 DATA 112,248,220,108,127,12
7,115,97,98,110,108,112,190,214,
218,238,234,234,110,106,112,120,
124,63,63,31,15,3,106,110,238,23
6,242,232,208,160,1,7,12,25,25,1
2,7,1,128,224,240,248,248,240,22
4,128,6,5,6,2,2,13,29,26,96,224,
224,192,192,176,184,120,57,51,51
,51,25,29,14,3,252,252,252,252,2
48,248,240,192,0,0,0,0,0,0,1,0
,0,0,0,0,0,128,7,12,25,25,12,7
,8,31,224,240,248,248,240,224,16
,248,57,51,51,51,25,29,14,3,252,
252,252,252,248,248,240,192,1,7,
31,127,143,241,254,255,128,240,2
54
1070 DATA 249,231,159,127,126,12
7,15,1,6,7,7,7,27,120,96,128,96,
224,224,232,222,124,143,241,254,
255,127,15,1,57,231,159,127,126,
120,96,128,15,31,63,63,127,0,127
```



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,127,252,252,250,250,246,12,236,
232,127,127,0,7,7,7,7,27,232,240
,0,224,224,224,236,220,60,63,127
,0,127,127,127,127,58,250,246,12
,236,232,232,240,3,15,28,56,113,
113,227,227,192,240,248,252,254,
254,255,255,227,227,115,121,57,2
8,15,3,255,255,254,254,252,248,2
40,192,0,0,3,15,60,120,241,243,0
,0,192,240,252,254,255,255
1072 DATA 243,241,120,62,15,3,0,
0,255,255,254,252,240,192,0,0,1,
7,31,127,143,241,254,239,128,240
,254,249,231,159,127,127,199,203
,219,227,247,127,15,1,127,127,12
7,127,126,120,96,128,1,1,3,3,7,5
,5,3,0,0,128,128,192,192,192,128
,0,1,98,177,201,0,15,63,0,128,14
0,26,46,0,240,252,0,0,0,0,3,5,51
,121,12,22,175,47,150,204,128,48
,220,220,105,48,6,11,15,6,120,88
,88,48,4,24,52,110,32,14,31,55,4
7,55,31,14,94,110,60,152,130,167
,117,34,0,0,0,0,0,0,0,1,0,0,0,24
,44,60,24,0,0,8,28,8,0,0,2,0,0,0
,64,0,0,48,88,88,0,6,15,11,6,0,0
,0,48,0,0,80,0,0,0,0,0,0,0,0,0
1080 LET d$="THREE": LET c=VAL "
0": RESTORE VAL "1100": FOR x=VA
L "50000" TO VAL "51518": READ a
: LET c=c+a: POKE x,a: NEXT x: I
F c<>VAL "193616" THEN  GO TO 12
00
1100 DATA 62,1,50,0,225,0,0,62,9
,50,5,225,62,241,50,150,224,62,1
44,50,149,224,205,108,195,195,39
,196,62,1,221,33,136,224,6,5,221
,119,0,60,221,35,221,35,221,35,1
6,244,253,229,253,33,216,214,221
,33,134,224,6,5,253,126,0,221,11
9,0,253,126,1,221,119,1,253,35,2
53,35,221,35,221,35,221,35,16,23
2,253,225,175,50,133,224,50,130,
224,50,4,225,50,18,225,205,155,3
4,62,1,50,1,225,205,107,13,62,2,
205,1,22,58,0,225,245,254,4,204,
212,195,241,254,6,204,212,195,24
,23,205,87,198,62,2,50,124,224,5
0,123,224,1,16,244,205,219,199
1102 DATA 62,32,205,228,199,201,
58,0,225,245,254,3,204,142,200,2
41,254,6,204,142,200,62,14,50,12
8,224,62,5,50,129,224,205,191,19
9,58,150,224,71,58,149,224,79,20
5,219,199,0,221,33,134,224,6,5,1
97,205,182,197,193,221,35,221,35
,221,35,16,243,201,175,50,1,225,
175,50,19,225,205,193,198,205,10
0,198,205,97,196,58,0,225,245,25
4,4,204,22,198,241,245,254,6,204
,22,198,241,245,254,3,204,42,200
,241,254,6,204,42,200,205,29,200
,58,19,225,254,1,200,24,203,0,22
1,33,134,224,0,0,6,5,197,58,1,22
5
1104 DATA 254,0,32,45,58,150,224
,71,58,149,224,79,197,205,219,19
9,175,50,151,224,205,182,197,205
,239,196,193,22,48,3,21,32,252,0
,205,219,199,62,1,50,151,224,205
,182,197,0,0,24,49,58,150,224,71
,58,149,224,79,22,48,3,21,32,252
,205,219,199,175,50,151,224,205,
182,197,205,239,196,58,150,224,7
1,58,149,224,79,0,205,219,199,62
,1,50,151,224,205,182,197,0,0,19
3,221,35,221,35,221,35,16,145,0,
58,1,225,254,0,40,3,175,24,2,62,
1,50,1,225,201,58,3,225,0,0,0,22
1,126,1,87,0,221,126,2,203,111,4
0,13,61,21,254,32,32,15,0,0,203,
175,0,40,8,60,20,254,7,32,2,203
1106 DATA 239,221,119,2,122,221,
119,1,201,58,3,225,198,1,50,3,22
5,58,131,224,254,0,40,3,205,163,
198,205,2,201,175,50,133,224,50,
130,224,60,50,19,225,1,80,244,20
5,219,199,62,32,205,228,199,1,0,
80,205,35,200,205,231,199,1,128,
244,205,219,199,62,32,205,228,19
9,1,0,80,205,35,200,205,231,199,
58,4,225,60,50,4,225,254,5,40,2,
201,0,58,150,224,71,58,149,224,7
9,22,96,3,21,32,252,120,50,150,2
24,121,50,149,224,0,0,58,0,225,6
0,50,0,225,254,7,194,108,195,0,0
,0,62,1,50,0,225,62,144,50,149,2
24,62,241,50,150,224,205,108,195
,58,5,225,61,50,5,225,254,0,192,
62,7,50,5,225,201,62,2,50,124,22
4,62,3
1108 DATA 50,123,224,0,197,221,1
26,0,254,0,40,75,103,221,126,1,1
11,58,151,224,254,1,32,50,58,128
,224,188,40,9,60,188,40,5,61,61,
188,32,12,58,129,224,60,189,32,5
,229,205,166,200,225,58,132,224,
188,32,17,58,133,224,189,32,11,2
29,221,54,0,0,205,24,197,225,193
,201,62,32,253,229,253,33,58,92,
205,228,199,253,225,193,201,58,1
6,225,103,58,17,225,111,62,2,50,
123,224,50,124,224,1,16,244,205,
219,199,62,32,205,228,199,58,128
,224,188,32,12,58,129,224,189,32
,6,205,166,200,195,212,195,37,44
,125,254,19,204,87,198,205,231,1
99,124,50,16,225,125,50,17,225,2
01,62,0,50,17,225,111,62,25,50,1
6
1110 DATA 225,103,201,58,130,224
,254,0,202,29,200,205,163,198,58
,131,224,61,254,0,40,14,50,131,2
24,58,133,224,60,50,133,224,205,
163,198,201,50,131,224,1,64,244,
205,219,199,62,32,205,228,199,20
5,29,200,62,32,205,228,199,175,5
0,133,224,50,130,224,201,62,1,50
,123,224,62,2,50,124,224,1,48,24
4,205,219,199,58,132,224,103,58,
133,224,111,62,32,205,228,199,20
1,62,2,50,123,224,50,124,224,58,
122,224,254,255,40,49,1,254,127,
237,120,203,79,40,65,1,254,223,2
37,120,203,71,40,112,1,254,253,2
37,120,203,79,202,129,199,1,254,
191,237,120,203,79,40,114,1,254,
251,237,120,203,71,40,63,195,29,
200,219,31,254,16,40,19,254,10,4
0,50,254,9,40,67,254,6,40,84,254
1112 DATA 5,40,106,195,29,200,58
,130,224,254,0,194,29,200,62,255
,50,130,224,58,129,224,0,60,50,1
33,224,58,128,224,50,132,224,62,
3,50,131,224,195,163,198,58,129,
224,254,1,202,29,200,205,191,199
,205,175,199,205,183,199,205,191
,199,201,58,129,224,254,1,202,29
,200,205,191,199,205,159,199,205
,183,199,205,191,199,201,58,129,
224,198,5,87,58,128,224,186,202,
29,200,205,191,199,205,175,199,2
05,167,199,205,191,199,201,58,12
9,224,87,62,25,146,87,58,128,224
,186,202,29,200,205,191,199,205,
159,199,205,167,199,205,191,199,
201,0,0,58,128,224,60,50,128,224
,201,58,129,224,60,50,129,224,20
1
1114 DATA 58,128,224,61,50,128,2
24,201,58,129,224,61,50,129,224,
201,1,48,241,205,219,199,62,2,50
,123,224,50,124,224,58,128,224,1
03,58,129,224,111,62,32,205,228,
199,201,120,50,55,92,121,50,54,9
2,201,50,121,224,213,229,62,2,20
5,1,22,225,30,0,1,0,0,253,54,87,
3,62,22,215,125,128,215,124,129,
215,58,121,224,131,215,28,12,58,
124,224,185,32,234,14,0,4,58,123
,224,184,32,225,253,54,87,0,209,
201,58,5,225,71,14,16,11,120,254
,0,32,250,201,62,2,50,123,224,50
,124,224,38,16,46,3,58,18,225,25
4,1,32,28,1,208,243,205,219,199,
62,32,205,228,199,205,118,200,1,
240,243,205,219,199,205,231,199,
175,50,18,225,201,1,240,243,205
1116 DATA 219,199,62,32,205,228,
199,205,118,200,1,208,243,205,21
9,199,205,231,199,62,1,50,18,225
,201,58,128,224,188,192,58,129,2
24,189,192,229,205,166,200,225,6
2,2,50,124,224,50,123,224,201,38
,16,46,3,62,2,50,123,224,50,124,
224,1,208,243,205,219,199,62,32,
205,228,199,201,62,1,50,19,225,5
8,2,225,61,50,2,225,205,191,199,
1,80,241,205,219,199,62,32,205,2
28,199,1,0,80,205,35,200,205,231
,199,1,112,241,205,219,199,62,32
,205,228,199,1,0,80,205,35,200,2
05,231,199,62,14,50,128,224,62,5
,50,129,224,205,191,199,58,150,2
24,71,58,149,224,79,58,1,225,254
,1,40,6,22,48,3,21,32,252,205,21
9,199,62,2,50,124,224,62,3,50,12
3,224,201,62,21,221,33,226,214,2
21
1118 DATA 110,0,221,102,1,221,70
,2,17,2,0,245,120,214,16,71,241,
245,221,229,229,197,213,205,181,
3,209,193,225,221,225,241,16,239
,17,3,0,221,25,61,32,213,201
1120: BEEP .1,15: RETURN
1200 BEEP .5,50: PRINT '"DATA ER
ROR IN DATA SECTION ";d$: STOP
```




```
 10 PAPER 0: INK 7: BORDER
 0: BRIGHT 1: CLS : LET hi=0: GO
 SUB 1050: GO SUB 500
  20 LET t=300: LET p=1: LET sc=
0: LET l=0: LET d=0: LET a$="ADB
(sp)CD(2*sp)": LET b$=a$: LET c$
="HE(sp)FHG(2*sp)": LET d$="MNOP
": LET e$="(9*sp)IJ(10*sp)IJ(7*s
p)IJ(5*sp)KL(5*sp)KL(7*sp)KL(4*s
p)KL(3*sp)": LET a=5: LET b=15:
LET c=1
  30 BORDER 0: BRIGHT 1: PRINT A
T 0,0; INK 0; PAPER 6;"(4*sp)SCO
RE(7*sp)HI-SCORE(8*sp)";AT 0,10;
sc;AT 0,25;hi;AT 21,0;"(4*sp)PON
D 1(6*sp)TIME 200(8*sp)": FOR f=
1 TO 15: PRINT AT f,0; PAPER 5;"
(32*sp)": NEXT f: PRINT  PAPER 1
;,,,,,,,,,,,
  40 LET e$=e$(32)+e$(1 TO 31)+e
$(34 TO 64)+e$(33): PRINT AT 16,
0; PAPER 1; INK 6; BRIGHT 1;e$:
IF d=1 THEN  GO TO 90
  45 PRINT AT a,b; PAPER 5; BRIG
HT 1;"(2*sp)";AT a+1,b;"(2*sp)":
 IF INKEY$="8" THEN  LET b$=b$(5
 TO )+b$(1 TO 4): LET a$=b$: LET
 c=1: LET d$="MNOP": LET b=b+1-(
30 AND b=30): GO TO 70
  50 IF INKEY$="5" THEN  LET c$=
c$(5 TO )+c$(1 TO 4): LET a$=c$:
 LET b=b-1+(30 AND b=0): LET c=-
1: LET d$="QRST": GO TO 70
  60 LET a=a+(INKEY$="6" AND a<9
)-(INKEY$="7" AND a>1): IF INKEY
$="9" THEN  LET d=1
  70 LET a$=a$(5 TO )+a$(1 TO 4)
: PRINT AT a,b; INK 0; PAPER 5;a
$(1 TO 2);AT a+1,b;a$(3 TO 4)
  80 PRINT AT 18,0; PAPER 1;"(32
*sp)": PRINT AT 0,10; PAPER 6; I
NK 0;sc: IF sc>0 AND sc/7=INT (s
c/7) AND l=0 THEN  LET e$="IJ(8*
sp)IJ(12*sp)IJ(6*sp)KL(5*sp)KL(1
0*sp)KL(7*sp)KL(2*sp)": LET p=p+
1: LET t=300-(((p-1)*20) AND p<1
0)-(160 AND p>9): PRINT AT 21,9;
 PAPER 6; INK 0;p;AT 21,21;t: LE
T l=1
  81 LET t=t-1: PRINT AT 21,21;
PAPER 6; INK 0;t;"(sp)": IF t>0
THEN  GO TO 40
  82 GO TO 200
  90 BEEP .001,60-a: LET p1=5: L
ET p2=5: PRINT AT a,b; PAPER p1;
 BRIGHT 1;"(2*sp)";AT a+1,b; PAP
ER p2;"(2*sp)": LET a=a+1: LET b
=b+c+(26 AND b<=2)-(26 AND b>=29
): PRINT AT a,b; INK 0; PAPER p1
; BRIGHT 1;d$(1 TO 2);AT a+1,b;
PAPER p2;d$(3 TO 4): IF a=16 THE
N  LET p1=5: LET p2=1: IF e$(b T
O b+1)<>"(2*sp)" THEN  LET e$(b-
1 TO b+2)="(4*sp)": PRINT AT a,b
; PAPER 1; BRIGHT 1;"(2*sp)";AT
a+1,b;"(sp)": LET d=0: LET a=8:
LET sc=sc+1: GO TO 81
  95 IF a=15 THEN  BEEP .01,10:
BEEP .01,12
 100 IF a=17 THEN  LET p1=1: LET
 p2=1: IF e$(b+32)<>"(sp)" THEN
 LET e$(b+31 TO b+33)="(3*sp)":
PRINT AT a,b-1; PAPER 1; BRIGHT
1;"(4*sp)";AT a+1,b;"(2*sp)": LE
T d=0: LET a=8: LET sc=sc+1: LET
 l=0: GO TO 81
 110 IF a>17 THEN  PRINT AT a,b-
1; PAPER 1; BRIGHT 1;"(4*sp)";AT
 a+1,b-1;"(4*sp)": LET a=8: LET
d=0
 120 GO TO 81
 200 FOR g=0 TO 10: FOR f=0 TO 7
: BEEP .001,f+40: OUT 254,f*8: O
UT 254,200: PRINT AT a,b; INK f;
```

```
 PAPER 5; OVER 1;"(2*sp)";AT a+1
,b;"(2*sp)": NEXT f: NEXT g: CLS

 210 PAPER 0: INK 7: BORDER 0: C
LS : PRINT AT 10,1; INK 5;"(ig8,
2*g3,g5,ig5,g7,ig5,ig8,ig1,g4,ig
8,ig5,ig8,2*g3,sp,ig8,g3,ig8,g5,
ig5,sp,ig8,g5,ig4,g3,g2,ig8,g3,i
g8,2*sp)"; INK 6;"(ig8,g4,ig3,g5
,ig4,g7,g5,ig5,ig8,g5,ig8,g5,ig5
,ig8,g3,2*sp,ig8,sp,ig8,sp,ig8,g
5,ig5,g5,ig4,g2,sp,ig8,g7,ig1,2*
sp,ig8,ig3,ig8,g5,ig5,ig5,g5,ig8
,sp,g2,g5,ig5,ig8,2*ig3,sp,ig8,i
g3,ig8,sp,g5,ig8,sp,g5,ig1,ig3,i
g7,ig8,sp,ig8,2*sp)"
 220 IF sc>hi THEN  BEEP .5,10:
BEEP .5,0: BEEP .2,12: BEEP .2,1
2: BEEP 1,20: PRINT AT 15,0; INK
 0; PAPER 6; BRIGHT 1; FLASH 1;"
(8*sp)A NEW HIGH SCORE(8*sp)": L
ET hi=sc
 230 PRINT AT 13,0; INK 7; BRIGH
T 1;"   PRESS A KEY FOR ANOTHER
GO   "
 240 PAUSE 1: PAUSE 0: GO TO 20
 500>PRINT AT 1,10;INK 7;"(ig4,g
3,g5,sp,2*g5,g3,ig5,ig4,g7,g5,g3
,ig5,19*sp)";INK 5;"(g3,g7,g5,g4
,g5,g5,sp,ig5,ig5,ig5,ig5,g3,g2,
19*sp,ig3,ig2,g5,ig2,ig2,g5,ig3,
ig5,ig1,ig2,g5)"
 510 PRINT AT 5,4;"YOU PLAY THE
PART OF THE          KINGFISHER. Y
OUR TASK IS          TO SWOOP DOWN
 INTO THE            POND AND CATC
H THE FISH           BEFORE YOUR T
IME RUNS             OUT. ONCE YOU
 HAVE EATEN          ALL THE FISH,
YOU WILL GO          ON TO THE NEX
T POND, BUT          YOU WILL HAVE
 LESS TIME           TO COMPLETE Y
OUR TASK."
 520 PRINT AT 16,5; INK 6;"USE T
HE FOLLOWING KEYS:           5-LE
FT,8-RIGHT,6-DOWN
7-UP,9-SWOOP"
 530 PRINT AT 20,0; INK 0; PAPER
 6; FLASH 1;"     PRESS ANY KEY
TO START     "
 540 LET a$="ADB CD(2*sp)": LET
b$="HE FHG(2*sp)"
 550 PRINT AT 1,5; INK 6;a$(1 TO
 2);AT 1,25;b$(1 TO 2);AT 2,5;a$
(3 TO 4);AT 2,25;b$(3 TO 4): OUT
 254,24: IF INKEY$="" THEN  LET
a$=a$(5 TO )+a$(1 TO 4): LET b$=
b$(5 TO )+b$(1 TO 4): OUT 254,20
0: GO TO 550
 560 RETURN
 600 STOP
1000 DATA 0,0,1,3,187,255,235,85
,43,54,44,52,40,88,112,224,224,1
76,89,41,181,215,235,127,0,192,2
24,56,191,248,224,192
1010 DATA 0,0,128,192,221,255,21
5,170,212,108,52,44,20,24,14,7,7
,13,154,148,173,235,215,254,0,3,
7,28,253,31,7,3
1020 DATA 0,32,65,115,127,115,65
,128,0,96,248,204,232,252,248,96
,0,6,31,51,23,63,31,6,0,4,130,20
6,254,206,130,1
1030 DATA 152,148,218,213,250,12
5,122,61,0,0,0,0,128,128,128,192
,30,7,0,0,0,0,0,0,240,216,232,24
8,124,12,2,1
1040 DATA 0,0,0,0,1,1,1,3,25,41,
91,171,95,190,94,188,15,27,23,31
,62,48,64,128,120,224,0,0,0,0,0,
0
1050 FOR f=USR "a" TO USR "t"+7:
 READ a: POKE f,a: NEXT f: RETUR
N
```

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Having escaped the ministrations of the sadistic Sisters of Health, we rode a short day and then made haste to replenish our energies. Zul and Zel cooked a great feast in the shadow of some ancient tomb lying some way off the roadside. Ivy tangled amongst its carved stonework and close inspection revealed an entrance.

The door fell into dust at the first touch. Iubba, clearly an expert tomb-robber, lit his lamp, drew out an amulet which, he claimed, could prevent the attack of hostile spirits, and wandered in unconcerned.

I left him to it, having seen the inside of too many tombs in my time, and busied myself with rubbing horse linament into my aching sinews. Some wine and a haunch of meat renewed my interest in the finer things of life and, wiping the grease from my beard — I have grown it on the journey as is my practice — I sauntered over to the sepulchre. Iubba had been some time.

The sun was nearly down and the shadows were long and eerie, Suddenly there came a cry from within. I rushed to the doorway, drawing my dagger. The lamp lay flickering on the floor and next to it the amulet — peabrain Iubba had left it, thinking himself safe. Not so, for round him curled a monstrous wraith of green smokey mist. Its baleful, ghostly fangs were ready to engulf him and the coils squeezed him dry of breath.

I seized the amulet, yelled "Urth na vechad!" — a fine spell against such emanations — and hurled it at the thing. Foul smoke arose and blue sparks crackled. The wraith wailed, wavered and faded.

Sharpish we beat our retreat from the place. Happily we reached a wayside inn, The Mad Axeman, some miles on. We joined the crowd, fortified our quaking souls and swapped stories.

One band found endless problems in the time quests of **Eureka!**. My knowledge of that journey is gathered from the fine maps and itineraries of The Frost of Montrose, Conqueror of Ket, to whom I owe great thanks, gladly given.

Paul the Almost-All-Powerful of Stockport and others could not find the Roman Witch nor knew what she required to help them. East of a hill there stands a cypress grove and her hut lies close to it. If you have a fossil tooth to give her she may well provide the recipe for a potion — but you will need other treasures too.

Poor Paul's axe was blunt and he could find no whetstone — look in a stream when you leave the legion's camp, and find a suitable stone.

Midge Mount of Helensburgh had come across a white rabbit in the Arthurian Age. It had defied all his attempts at slaughter. A spare carrot could be useful here — rabbits are greedy and dropping the carrot may give results.

Tel Taylor of 20 Lea Road, Bacup, Lancashire OL13 0EA, answered Ironman Johnson's request to know the way to enter the Legion's camp. The guard will lapse at nightfall so wait before the camp 'til then. Nothing will bar your way thereafter. Tel will offer help with all of **Eureka!** if you write prepaid.

Gordo swaps stories and advice with fellow questers at *The Mad Axeman*

Bruiser Browne of Claydon, Australia sought help with his **Golden Apple**. How, says he, shall I use the white handkerchief and what use is the parrot? If you are a snorer such as I you will know that a kerchief will protect the mouth while sleeping — from flies or what have you. Use it thus in the bedroom.

The parrot talks. Question it well and it should say '2B'. A computer will later use that statement. Trying my patience, this Bruiser then asks me how to take the emeralds from their glass case. Sing for it, my son, sing.

Krazy Kris Chesney of Bolton, drinking deep, told me of his tribulations in **Hampstead**. "Listen," he says, "All I have is a dead-end job at a merchant bank, no money to do anything, a car with nowhere to go, a useless filing cabinet and who's Pippa?" Such despair at so young an age! The key to his social problems is the cabinet. Going shopping at a large store and much curiosity about desks will bring some aid in opening the cabinet — life may suddenly look rosier then.

Hawkeye Hawkins asked for any help at all in being **Bored of the Rings** and also tells me there is another light source in **Lords of Time** — if you tell the tooth fairy the coin she gives you is not enough, she will produce a firefly. The fly is longer lasting than any candle. Now, in 'Bored' the Nazuls in their C5s can be defeated by shooting the rifle — remember it destroys plastic. Rick the Boggit was also trapped in a willow tree — a call for help will bring Tim Bumbadil to your aid.

Off in a corner, Mighty McKinnon of Glynder passed on the secret of how to capture Zoff in **Shadowfire**. "Place Manto just outside the armoury and drop the transporter. Send another fighter into the armoury and then the Zoff quarters. Zoff will then move away past the armoury and out the door where Manto and the transporter wait. Manto must then activate the transporter and beam Zoff to the Enigma craft. But be quick with the transporter or Zoff will escape." This science is beyond me.

Lars Lindholm of Hjorring, Denmark, sailing with **Erik the Viking**, found that his vessel sank time and again. Nowhere could he find some wood to repair the dragonship. Well, there are some benches in Erik's home hall — broken up, those will make good planks and keep the ship seaworthy.

For £1.00 to cover the mail this Dane will send you maps and solutions to **The Hobbit, Hampstead** and a map of London and Leatherhead for **Sherlock**. Write to Lars at Mimersvej 6,9800 Hjorring, Denmark.

Pierre Miranda of Neuchatel, Switzerland has trouble with **Gremlins**. He could not kill the dart-throwing Gremlin in the bedroom or find the Mogwai in the kitchen. The answer lies in the Peltzer — press its buttons to open new hiding places in the kitchen. You will find the Mogwai and a sharp knife to slay the darter. Good hunting.

So to bed, still quaking in our boots — I never take them off. Ride safely 'til next moon my friends. Farewell.

Greatbelly

Gordo Greatbelly, Landlord

If your have a tale to tell, or are in need of a helping hand, write to the Landlord of the Dancing Ogre c/o Sinclair User, Priory Court, 30-32 Farringdon Lane, London EC1R 3AU.



The secrets of Pandora's box

Richard Price gets out his ruler and finds Adrian Mole is somewhat lacking

FOR AGEING wrinklies who have not quite snuffed it yet, adolescence tends to be a lost dream of guilt and severe emotional torture punctuated by acne vulgaris.

As the years pass I had forgotten the torment of being an "almost 14 year old undiscovered intellectual" and have been trying to adjust to the idea of being almost 35 (surely some mistake? Ed.) and equally undiscovered.

Until recently, computer games helped to soothe those old pains, rather like Clearasil on a particularly noisome spot. The world they portrayed was a *Boys Own* fantasy of righteous violence, easily recognised and incorrigibly evil enemies, and damn few gels to spoil the fun.

A Mole Esq has put a stop to all that.

The Secret Diary of Adrian Mole

In the latest spin-off of the original book, **The Secret Diary of Adrian Mole** has been translated onto tape. Complete with naughty thoughts, squeezed spots, *Big and Bouncy* magazines and a few extra events for good measure, the daily doings of the ex-istentialist with the breaking voice can now be loaded up on your Spectrum.

Although my admiration for Mole and all his works is pretty well unbounded I ought to say right now that I'm not sure how well the concept works as a computer game. The suite of four programs is published by Mosaic and programmed by Level 9.

The diary format has been retained and you should not expect to see a standard text adventure set in Mole's sweaty world. What happens is that the diary entries scroll up the screen day by day. At points of decision you are given three choices of possible actions. Events will be affected by those decisions and your status – how popular you are – is shown as a percentage. You can choose to work towards a high or low score depending on your psychological outlook at the time you play the game.

So, for instance, Mole is stuck in Scotland with his mother and her unspeakable insurance-salesman fancy man – 'Bimbo' Lucas. The day's entry runs thus . . .

"Went to see Rob Roy's grave. Saw it. Came back. What shall I do?

1) Phone Pandora, reversed charges.

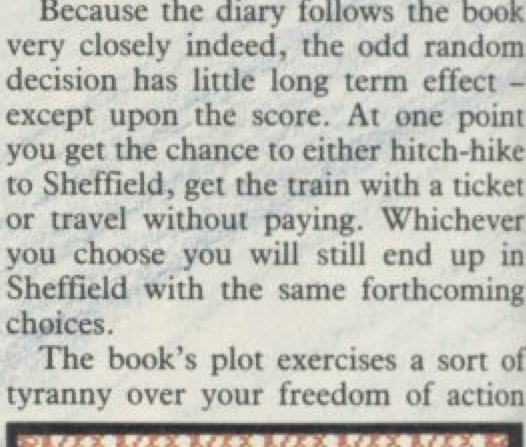
2) Send a haggis postcard to Pandora.

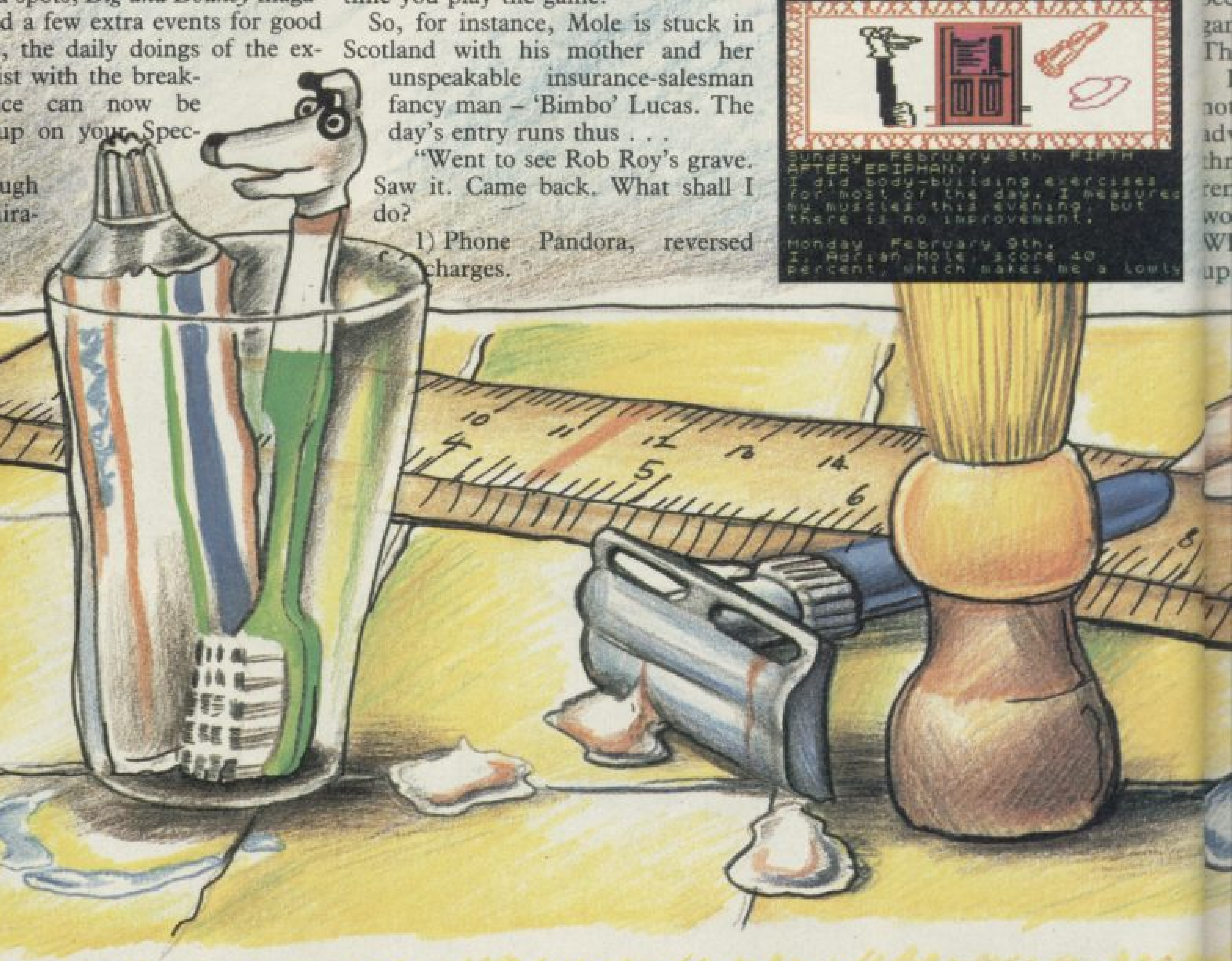
3) Phone Pandora normally."

The style of the game then is very like the options fantasy books so popular in the last few years. In terms of computer gaming, however, the idea imposes quite severe limitations.

Because the diary follows the book very closely indeed, the odd random decision has little long term effect – except upon the score. At one point you get the chance to either hitch-hike to Sheffield, get the train with a ticket or travel without paying. Whichever you choose you will still end up in Sheffield with the same forthcoming choices.

The book's plot exercises a sort of tyranny over your freedom of action





and, regrettably, even the chances to choose are few and far between. I suspect that the publishers didn't want Level 9 to interfere too much with the text and storyline. The result is that you read the diary on screen and occasionally press a key.

After I had played the four programs through a few times – each holds a quarter of the year – I felt I might just as well read the book and cut down on eye strain.

There are some good features. There is a command function which allows you to get some biographical



details on the characters, print out the text and so on. The pictures can be switched in or out but are no more than motifs of bits of Mole's life. I used the 'picture off' function on two occasions and managed to slow the game down to a painful snail's pace. That must be a bug.

It's disappointing that Level 9 has not been allowed to produce a real adventure. What carries the game through is the book text itself, irreverent and rude. Without that the game would not stand much of a chance. What the program does do is to open up computer games to the real world.

Fairlight

Now back to fairytales . . . Once upon a cassette there was a land called **Fairlight**, a land of peace, blue skies, free beer – a realm where taxi drivers never overcharged and magic prevailed. Then came war and disaster.

This is the readily recognisable setting for **Fairlight**, a new graphic adventure from the Edge.

Isvar the hero is shown as a moustachioed figure, cloaked and armed. The world he wanders through leaves the gridiron-planned environment of **Knight Lore** standing in awe, for the castle's plan and geography is as bewildering as a real one.

Staircases and corridors lead to halls, cells, gardens and courtyards. Furniture, food and other odd items are scattered around and the place is guarded by scuttling orcs, thuggish trolls and ogres.

Those creatures have some intelligence and will chase and attack if you





violate their territory. A combat system will weigh up your respective strengths and you must enter into direct action with the monsters. You must maintain your own strength by regular eating – food can often be found in the orcs' barrack rooms or the finer private apartments of the castle. Many of the objects can be carried but all of them have a weight.

Momentum also exists here and if you push a table loaded with a flagon and chicken the eatables will carry on moving when the table stops. Very realistic and extremely convincing.

The keyboard offers a full range of actions including Fight and you are given the option of using a Kempston stick for the movement combat.

This is one of the most complete and satisfying role-playing graphic games I have yet seen. There is quite simply so much to do, so much to explore and so much to experiment with.

Let's take a look at the orc guards. When you enter a room you may only see a couple of their helmets lying around. Suddenly, the helmet grows into a fully fledged and bellicose

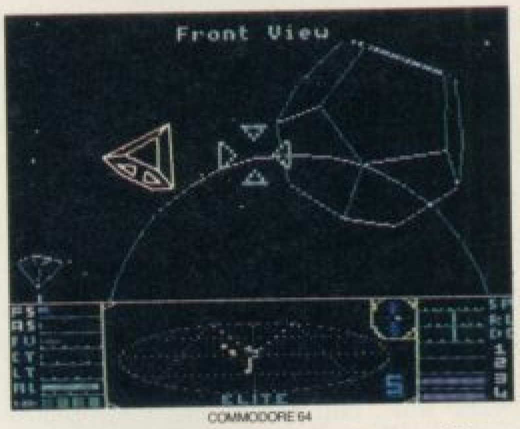
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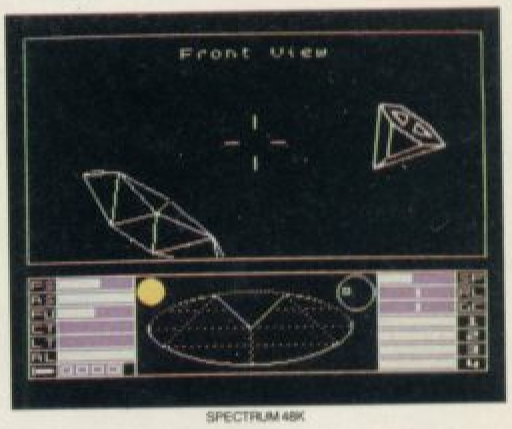




BE DANGEROUS.



COMMODORE 64



SPECTRUM 48K



continued from page 125

warrior. After a while you realise that the orcs regenerate from the helmets. I spent hours on the dungeon level looking for places to imprison the helmets so that they wouldn't bother me. Early on you will find a scroll which will help you to escape when you get utterly entombed.

Fairlight is state-of-the-art. It's a classic in every sense – go get it.

Marsport

Right, power up your hyperdrive, shoot forward into the 25th Century and set your docking computers for entry to **Marsport**.

It's 2494 and the Earth has now been besieged for decades by the forces of the Sept – alien beings, they are spacefaring, warlike and merciless. The Earth has been kept safe by means of a power sphere around the orbit of the moon but the Sept have found the original plans for the sphere at Marsport.

Guerrilla fighter John Marsh has been despatched to Mars to locate and retrieve the plans and you must assist him through the ten levels of the dome. Escape is only possible with the plans and there are many ways to die.

The game is controlled and designed in the same movie style of **Tir**



Na Nog and **Dun Darach**. The spacesuited figure of Commander Marsh strides along corridors in much the same way as Cuchullain. Action is smooth and unflickering in a convincing 3D way.

The Warriors are hopping beetle-like creatures who move fast and never ask questions. The Warlords, more noble and less frantic, sit in corridor spaces like arachnid cabbages – only their probosci are scorpion-like and kill on contact.

When you enter the base from the Spacefield your first purpose should be to get some sort of weapon. You are placed on the 'C' level of the base, and must descend to the Daly level where the supplies are kept.

Having explored a bit you'll probably find the Downtube. It's only then that you realise that the lift tubes don't connect one floor to the next as you'd expect . . . they miss one out. Now you're on Elis level, a residential section where the Sept have their quarters. Watch out.

There are chutes for refuse, lockers where goods can be stored, points for charging weapons and supply units which will provide you with things like guns, gun permits, charcoal, flour and a wide range of consumer goods.

Try to locate Factor Units – those will assemble two or more objects to make a new one. There are also Key stations situated near doors or wall units. They will open the door if you can insert an appropriate object into them.

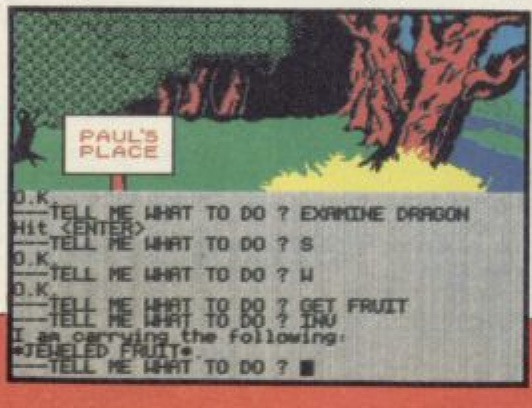
Gargoyle has yet again produced an enormously sophisticated program. The introduction of an arcade element with the power-gun adds extra zing (or zap) to the proceedings. Top marks to a firm who deliver consistently fine software.

Adventureland

Lastly this month there are two games from Adventure International. Those are packed together in a Value Pack and are two of the earlier Scott Adams text adventures, **Adventureland** and **Secret Mission**.

Adventureland is an archetypal game. It's set in a fantasy world of dragons, magic carpets, lamp genies and the like. The aim is to discover and store a number of treasures, 13 in this case.

The action moves rapidly from forests to underground caverns and dismal swamps and there are magical beings to encounter along your way.



Descriptions are not vast but they're very much to the point and contain all the information you'll need.

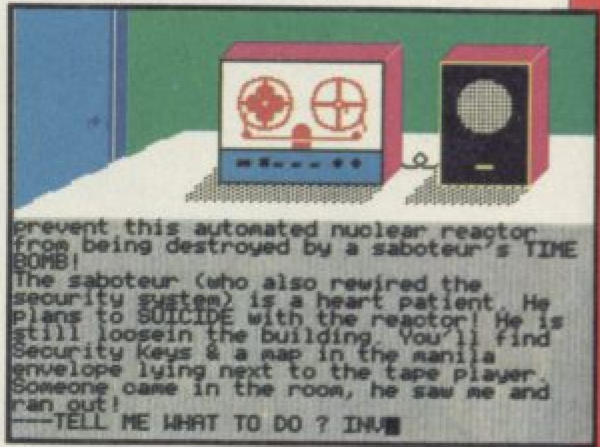
Useful hints are provided in response to some inputs and objects can be used by means of prepositions – if you say 'Throw Axe' the interpreter will tell you to 'tell me at what . . . like: AT TREE'. That is a handy routine and gets round the limitations of the normal verb/noun input system. The game is fun even if its style and storyline are now a bit dated.

Secret Mission

The second game, **Secret Mission**, has more of a plot and places you on the inside of a nuclear reactor which is threatened by a suicide bomber.

The detective-cum-spy format is set in a futuristic world where you must learn the function of numerous control panels and must find ways to pass security doors guarded by video cameras and electronic security systems. The reactor building is split into a number of colour coded levels and the first task is to discover the correct passes to enter protected sections.

Both programs are well produced and the idea of providing broad hints at difficult points provides an incentive to carry one if you get stuck – which will happen, I assure you.



The Secret Diary of Adrian Mole
Publisher Mosaic
Price £9.95 **Memory** 48K
★★★

Fairlight
Publisher The Edge
Price £9.95 **Memory** 48K
★★★★★

Marsport
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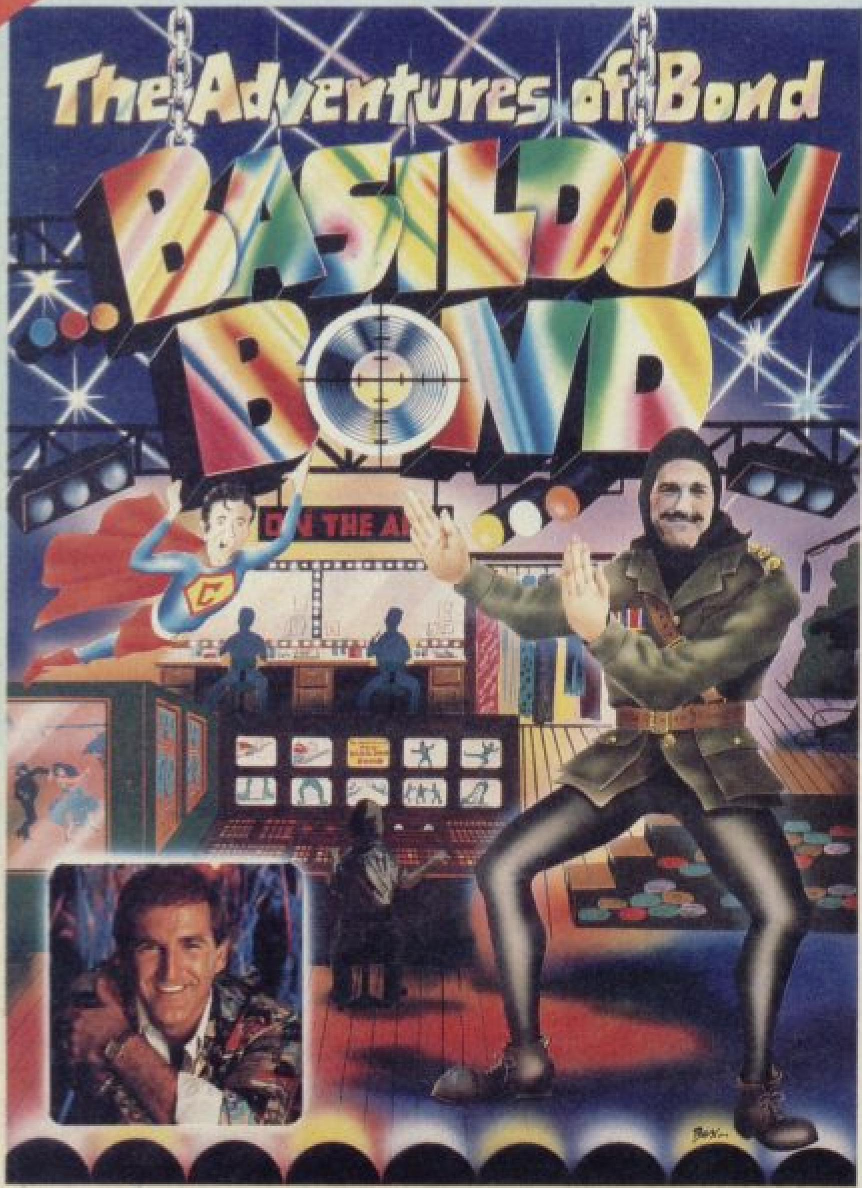
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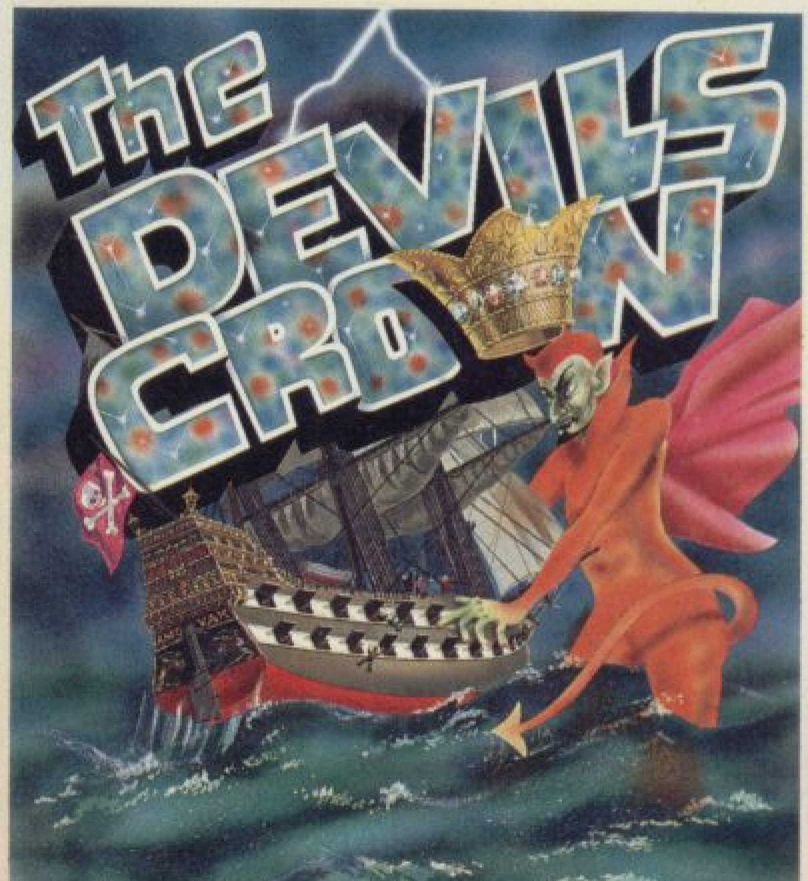
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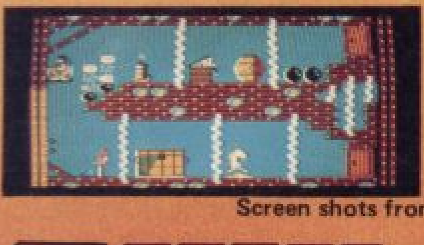
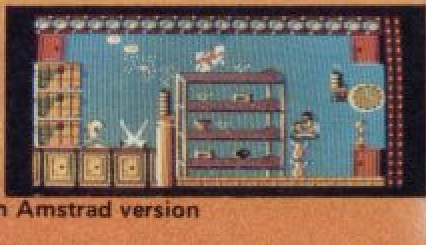


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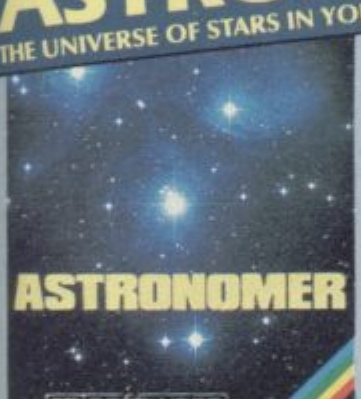
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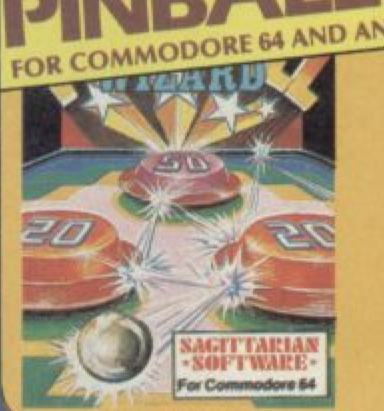
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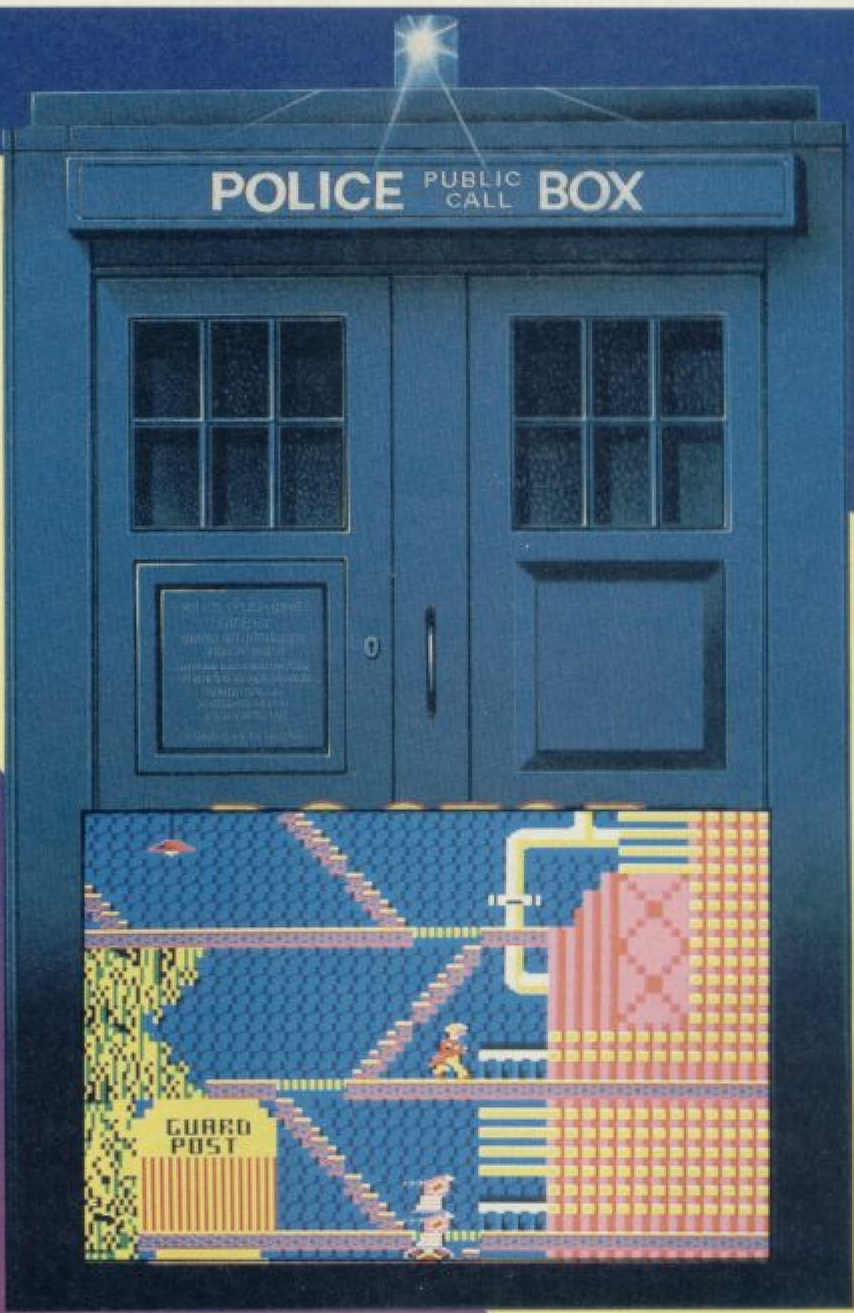
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BATTLE the evil Master on the planet Rijan, in a thrilling *Dr Who* adventure from Micropower. The Doctor's arch-enemy has been busily mining Heatonite there to power his Time Instant Replay Unit which will allow him to interfere with the history of the Universe.

The Doctor will need all his agility and mental power to halt the mining process and disable TIRU, with the aid of Splinx, a robot cat, and the various objects he'll find in the mining complex.

Included in this animated graphic adventure game are a booklet giving background information on the planet Rijan, partial maps of the complex itself, a decoder card essential for penetrating the security system, and a symbol card to help read the screen. The screen pictures on this page give you some idea of the graphics, though they are, admittedly, taken from the BBC version.

Brain-to-brain combat is what Micropower expects of you, not joystick bashing, so before you get to play the game you'll have to prove yourself worthy of taking up the challenge. And you'll need every ounce of intelligence you possess to help the Doctor defeat the enhanced saurian Madrag, disable guard robots and crush the Master.

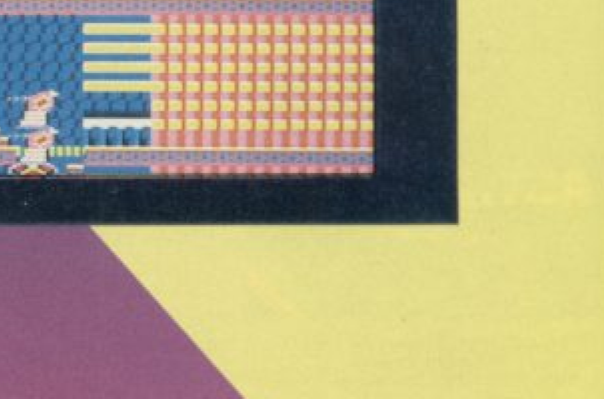
The BBC has approved the plot of the game, so you can be sure the Doctor stays faithful to his TV character — but how much do you know about the mysterious Time Lord? There's 100 copies of **Dr Who and The Mines of Terror** for the lucky winners.

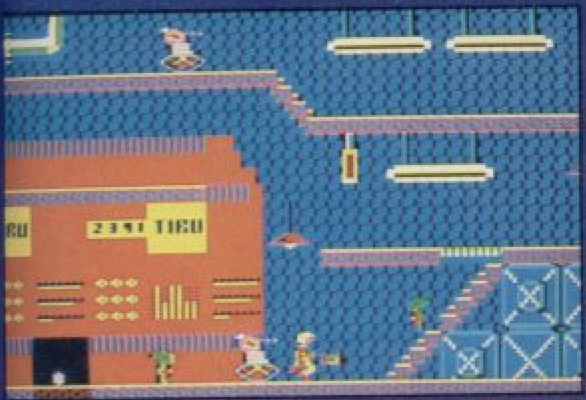
All you have to do is to answer the six questions opposite which any *Dr Who* fan will find easy. To make it easier, we've given you three possible answers for each question, so you just have to pick the correct one.

On the other hand, why should we make it that easy? After all, if you really think you can play the most intelligent being in the known universe, you must have a few brain cells left. So when you've answered the questions, there's another puzzle to work out.

We've hidden an anagram in the puzzle — a six-letter word. You can extract the letters from the number 166572. Take the first letter of answer one, the sixth from answers two and three, the fifth from answer four and so on. Those letters, properly rearranged, form a word, which should remind you of a famous *Dr Who* character.

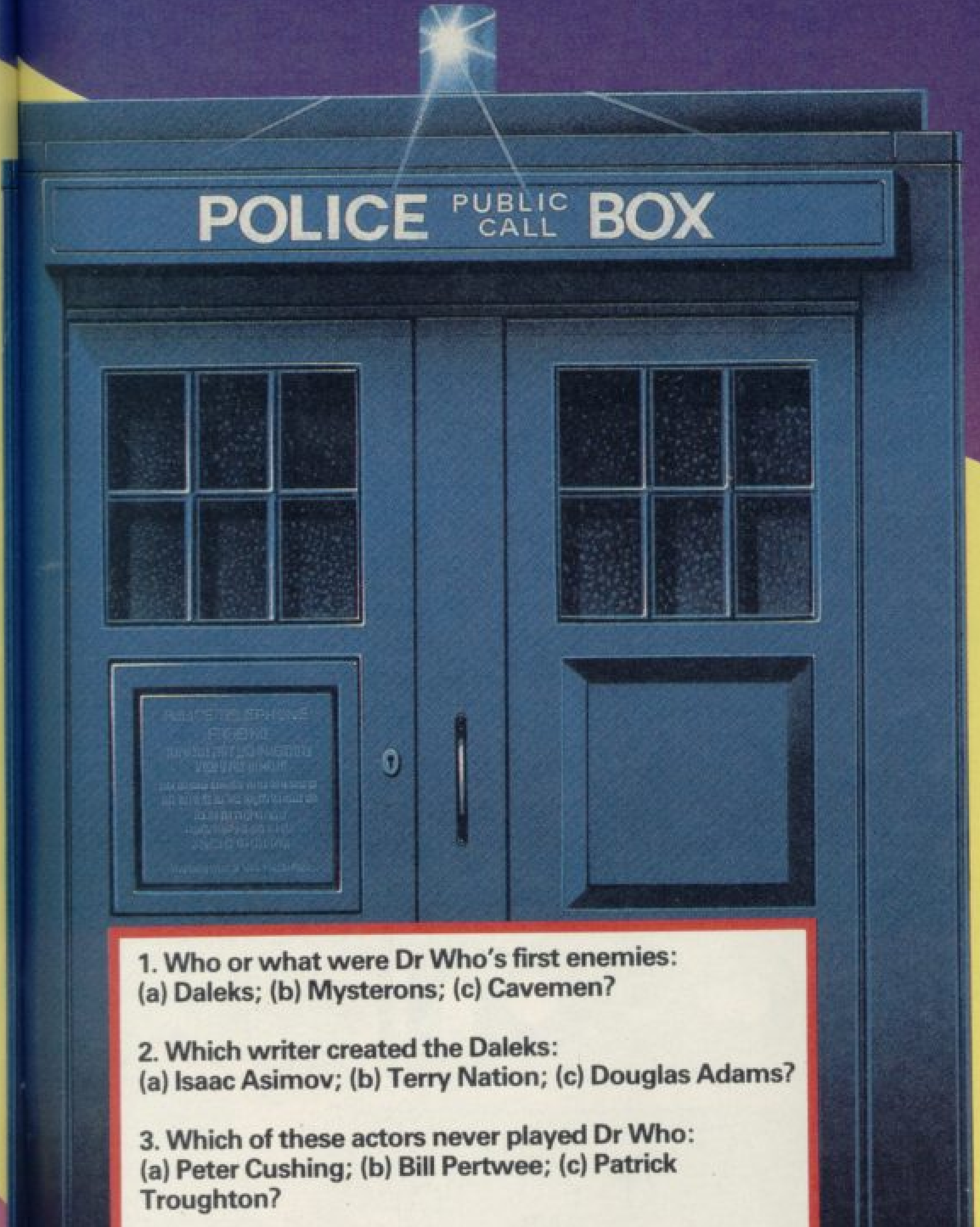
Write the correct name of the character on a postcard and send it to us at Dr Who Competition, *Sinclair User,* Priory Court, 30-32 Farringdon Lane, London EC1R 3AU not later than Friday December 20. The first 100 correct entries out of the bag after that date will receive a copy of the game — worth £14.95 — so get to it, apprentice Time Lords. Employees of EMAP are not allowed to travel through time, and therefore cannot enter.





Knock, knock, Who's here . . .

Who has the answers to our Dr Who competition. Who will win the 100 games? Who knows. *(Who wrote this headline. Ed)*



1. Who or what were Dr Who's first enemies:
(a) Daleks; (b) Mysterons; (c) Cavemen?

2. Which writer created the Daleks:
(a) Isaac Asimov; (b) Terry Nation; (c) Douglas Adams?

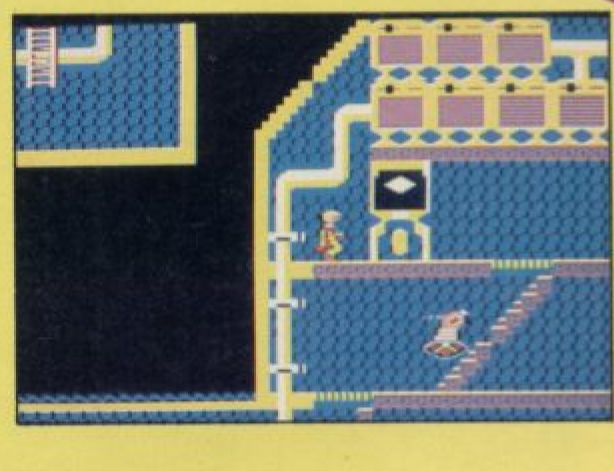
3. Which of these actors never played Dr Who:
(a) Peter Cushing; (b) Bill Pertwee; (c) Patrick Troughton?

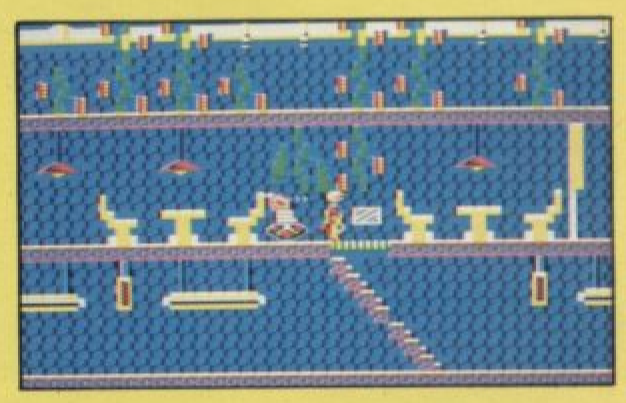
4. What is the Doctor's home planet:
(a) Earth; (b) Skaro) (c) Gallifrey?

5. Where did Dr Who's assistant Peri come from:
(a) America; (b) Megastethos) (c) Australia?

6. Which actor plays Dr Who's greatest enemy, the Master:
(a) Brian Blessed; (b) Tom Baker; (c) Anthony Ainley?

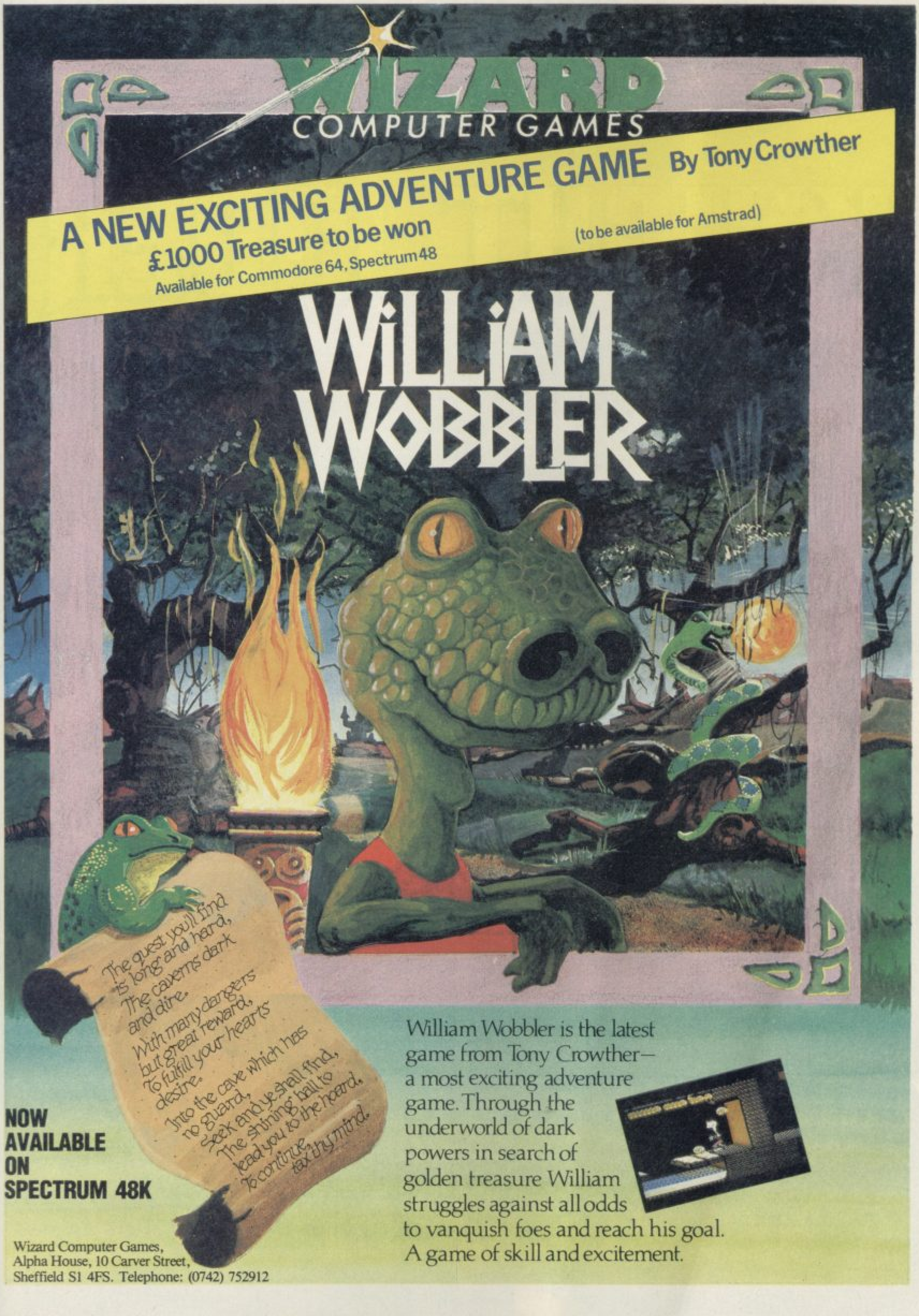




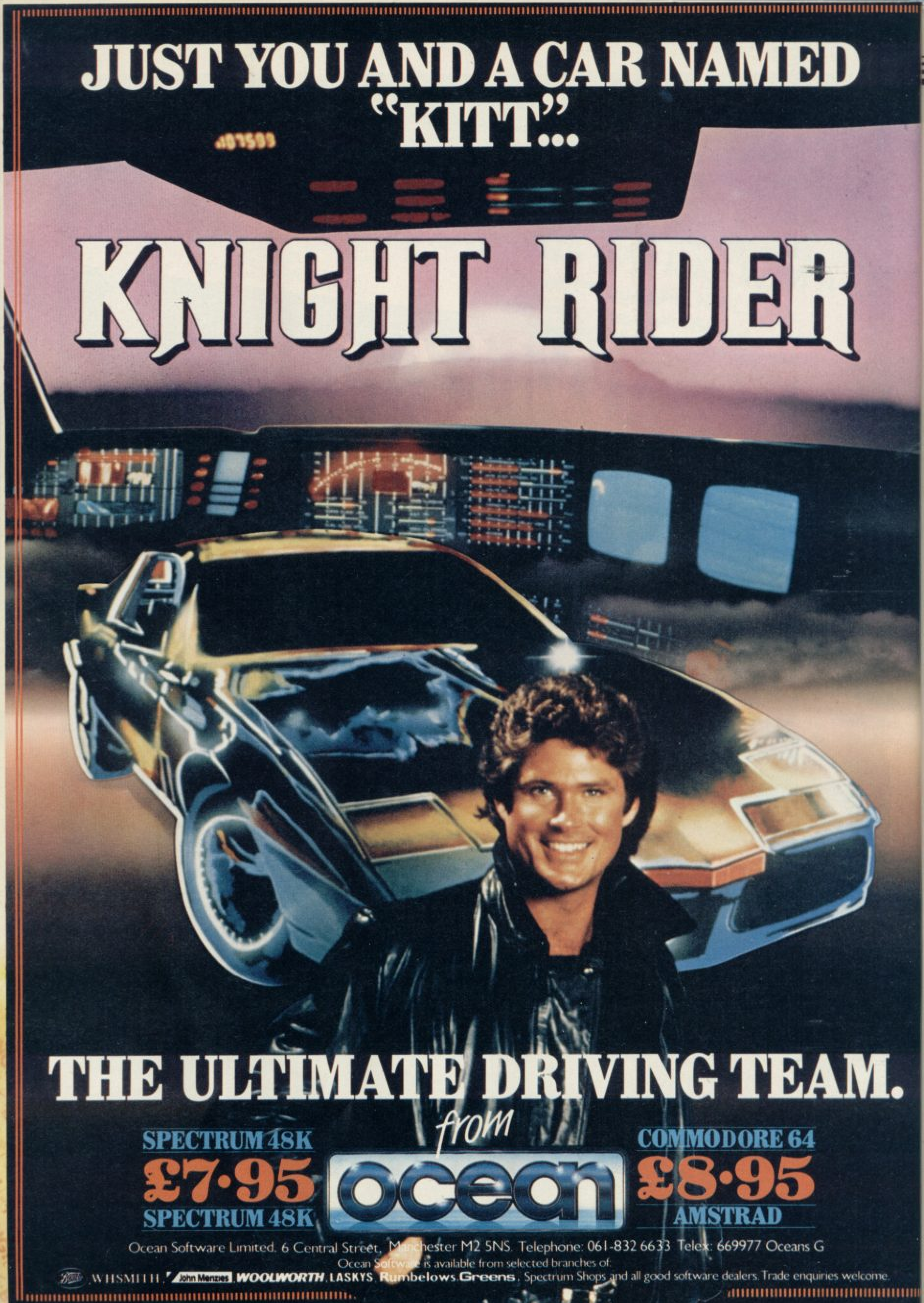




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Let's go do the hop

Scrolling troubles? Andrew Hewson oils the cogs

PART OF THE difficulty of writing the Helpline column is in working out how to deal with the questions sent in. Often a letter poses a simple question which ought to receive a simple answer. However, when I attempt to construct a suitably simple answer I quickly find myself embroiled in hopeless complications.

I find myself in just such a situation following the receipt of a letter from Nuno Goncalo Rodrigues of Lisbon, Portugal. He asks a deceivingly succinct question: **On the Spectrum, which is the best way to change Basic into machine code?**

That question would be easy to answer if it did not include the word best because I could, with a clear conscience, list two or three methods and leave the reader to discover that the best way depends on what the final program is intended to do. For example, if a fast action arcade game is required and Basic has been found to be too slow, then probably the only satisfactory method is to re-write the Basic program from scratch in assembler code and use an assembler. Alternatively, if high speed is important but not vital at all times, and a more compact program is required so to squeeze more routines into the machine, then a compiler is probably the best bet.

The choice still remains between an integer-only compiler which advantages of both speed and space over one which uses floating point arithmetic. The application may demand the use of decimal numbers making the latter the only choice.

A final alternative which often doesn't occur to micro owners brought up to regard Basic as in some way sacrosanct, is to create your machine code from some other high-level language. Neither the structure of Basic nor its implementation on the Spectrum makes it ideal starting material for conversion to machine code. Hence, if you have a particular application in mind and you want to write in a high-level language for later conversion, I suggest you consider obtaining one of the alternative editor/compiler combinations now coming on to the market.

The above discussion assumes a certain familiarity with the functions of Basic interpreters and compilers, but there is a constant problem of using words that you may not understand. I am, according to George Seymour of Wakefield, not the worst offender in this regard and so he has chosen to send me a list of items 'to be defined over the next few months.'

Scanning Mr Seymour's list I found editor, assembler, disassembler, compiler and interpreter, all of which are relevant to the present discussion.

An assembler is a very flexible, if laborious, program for directly creating machine code routines. A machine code routine consists of a sequence of instructions which the Z80A understands directly, without any need for prior interpretation. Simple instructions are held in one byte of memory but more complicated instructions can occupy as many as four bytes. Generally, the instructions are executed in the order in which they are encountered, although there are exceptions.

The decimal or hexadecimal codes for all 600 or so instructions in the Z80A instruction set are difficult to remember, and so for this and other reasons machine code programs are almost always written using an assembler. An assembler converts instructions like 'add a,b' which directs the microprocessor to add the contents of the A register to the contents of the B register and to leave the result in the A register, to the correct code.

An assembler also allows you to name variables, add comments and give labels to various points in the program, allowing you to call subroutines using the labels. A good assembler will have other facilities as well, all aimed at making your job as straightforward as possible.

A disassembler performs the opposite function to an assembler — it converts a sequence of numbers into a sequence of mnemonics which are easier to understand than the original code. A list of the more important mnemonics is given in the original Sinclair manual in Appendix A. A disassembler is of use when analysing code written by somebody else to find out how it works.

The output from an assembler is a program which the microprocessor can understand directly because it consists of machine code instructions. In contrast, a program written using an interpreter, such as Sinclair Basic, is held in RAM in more or less the form in which it was entered.

Interpreters are high-level languages which bear little or no relationship to the instruction set of the processor on which they are run. However, every time the program is executed each line must be analysed by the processor before the required action can be taken. The principal disadvantage of the system is that the programs can be slow to execute because the processor spends most of its time working out what each program line means.

A compiler gets round that problem by analysing each program line only once, and then storing a sequence of machine code instructions which are equivalent to the original program. Thus the speed of a machine code program is obtained without losing the convenience of a high-level language. The machine code produced by a compiler can be rather tortuous and inflexible, and so when efficiency is essential an assembler is used instead.

Finally, Mr Seymour asked for the definition of an editor. That is a difficult task because the word is applied to a whole class of programs which perform broadly similar functions in a wide variety of applications. The best idea is to describe a few examples of editors so that the common facilities become evident.

By far the most common editor used

continued on page 140

continued from page 139

on micro-computers is not normally referred to as an editor at all. It is an editor which is used to create text — I

```
10 FOR I = 16384 TO 22527
20 POKE I , 255
30 NEXT I
40 PAUSE 0
```

Table 1. A Spectrum program designed to reveal the structure of the display file.

refer, of course, to a word processor. Most will know that a word processor is used to write words, delete them, copy them from place to place, rearrange them and save them on disc or tape to be accessed later. That is typical of the range of activities of an editor program.

Another example is the Basic line editor incorporated into the Sinclair ROM. In this case the program does not exist as a entity separate from the other routines within the ROM. Nonetheless, it is possible to think of it as a self-contained group of routines. This editor can be used to write Basic lines, delete them, copy them from place to place, rearrange them or save them on disc or tape.

A third, less familiar example, is to be drawn from the variety of graphics editors. Those can be used to create graphic images of varying size and complexity, to delete them, copy them from place to place, rearrange them or save them on disc or tape.

At the fundamental level, each of those types of editors are used to manipulate computer memory, and to interpret the contents of memory in a manner appropriate to the application — words, Basic lines or graphic images. Editors are software devices for the manipulation of memory according to the rules and regulations governing a particular application.

Paul Roberts of Yeovil, who has an assembler, writes **Help! I'm baffled by the DEFB command. I know that it's some sort of data statement but I don't know how to use it. Could you explain it in detail? I need help with the DEFM and DEFW commands.**

An assembler is an extremely useful tool to anyone who is keen on working in machine code. It may seem perverse, therefore, to discover that most assemblers include commands such as DEFB, DEFM and DEFW, the purpose of which is to allow you to include codes directly in your program, obviating the need for the assembler.

The situation is not as daft as it sounds. For example, you may wish to write a message on the screen. The DEFM command allows you to include the codes for the letters which make up a message in the program — DEFM standing for DEFine Message.

DEFB and DEFW stand for DEFine Byte and DEFine Word respectively. They are used to insert a single byte — DEFB — or a pair of bytes — DEFW — into a machine code program.

Label	Assembler	Numbers to be entered
	ld hl,16348	33 0 64
	ld de,16640	17 0 65
	ld c,192	14 192
nextline	ld b,32	6 32
copybyte	ld a, (de)	26
	ld (hl),a	119
	ld a,c	121
	cp 2	254 2
	jr nz,nextbyte	32 2
	sub a	151
	ld (de),a	18
nextbyte	inc de	19
	inc hl	35
	djnz copybyte	16 243
	push de	213
	ld de,224	17 224 0
	add hl,de	25
	ex (sp),hl	227
	add hl,de	25
	ex de,hl	235
	pop hl	225
	dec c	13
	ld a,c	121
	and 7	230 7
	cp 0	254 0
	jr nz,subtract	32 10
	push de	213
	ld de,2016	17 224 7
	and a	167
	sbc hl,de	237 82
	pop de	209
	jr nextblock	24 14
subtract	cp 1	254 1
	jr nz,nextblock	32 10
	push hl	229
	ex de,hl	235
	ld de, 2016	17 224 7
	and a	167
	sbc hl,de	237 82
	ex de,hl	235
	pop hl	225
nextblock	ld a,c	121
	and 63	230 63
	cp 0	254 0
	jr nz,add	32 6
	ld a,7	62 7
	add a,h	132
	ld h,a	103
	jr nextline	24 187
add	cp 1	254 1
	jr nz,nextline	32 183
	ld a,7	62 7
	add a,d	130
	ld d,a	87
	ld a,c	121
	cp 1	254 1
	jr nz nextline	32 174
	ret	201

Table 2. A Spectrum program to scroll the display up by one pixel.

Kevin Lamont of Midlothian, asks: **I have worked out a machine code routine to scroll my graphics one pixel to the left or one to the right, but how do I scroll them up or down?**

The Spectrum display file is at the bottom of RAM between 16384 and 22527, inclusive, with the attributes area at 22528 to 23295. Calculation shows that there are 6144 bytes in the display file, and as there are 32 characters in each of 24 lines displayed on the screen, which means there are eight bytes per character.

You can see how those bytes are used by running the program listed in table one. The screen will gradually be covered with black horizontal lines. Notice that each line is separated from its predecessor by eight verticle steps, lines are drawn in groups of eight and that at the end of each group the next line is drawn back at the beginning of the group. There are three such groups.

You can observe the structure of the display file by SAVEing it and LOADing it to and from tape using the SCREEN$ command.

In effect, the display is divided into three separate units and within each unit there are 256 bytes determining the top eighth of a character position. Another 256 bytes determine the next eighth and so on.

The attributes area is 768 bytes long — one byte per character position. It is scanned in the logical fashion, so that, say, the attributes of the fifth character on the second line are determined by the contents of memory location number 22527 + 32 + 5 = 22564. The attributes byte specifies the foreground and background colour of each character, so that at most two colours can be obtained per character position.

The program in table two scrolls the display file up by one pixel only. It can be loaded using either an assembler or the decimal loader listed in table three.

```
10 FOR I = 23296 TO 23551
20 INPUT J
30 PRINT I,J
40 POKE I,J
50 NEXT I
```

Table 3. A simple Spectrum decimal loader for POKEing codes into the printer buffer.

● *Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewsbury, Oxfordshire.*

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Hartland Software, 32 Ivor Place, London NW1 6DA
Heinemann Computer Education, 22 Bedford Square, London WC1B
Hessel, 15 Lythan Court, Cadwell Crescent, Sunningdale, Berkshire
Hestacrest, PO Box 19, Leighton Buzzard, Bedfordshire LU7 0DG
Hewson Consultants, 56B Milton Trading Estate, Milton, Abingdon
Hilderbay, 8/10 Parkway, Regents Park, London NW1 7AA
Hilton Computer Services, 14 Avalon Road, Orpington, Kent
Hisoft, 180 High Street, Dunstable, Bedfordshire LU6 1AT
Hodder & Stoughton, PO Box 6, Dunton Green, Sevenoaks, Kent
Homestudy Ltd, Treleigh Woods Farm, Treleigh, Redruth, Cornwall
Hornby Software, 21 Penfold Hill, Leeds LS15 0PW
Icon Software, 65 High Street, Gosforth, Tyne and Wear NE3 4AA
IMS Software, 143/145 Uxbridge Road, Ealing, London W13 9AV
Image Systems, 34 Lynwood Drive, Worcester Park, Surrey KT4 7AB
Imagine (84), 6 Central Street, Manchester M2 5NS
Impact Software, 2 New Street, Cullompton, Devon EX15 1HA
Imperial Software, Imperial House, 153 Churchill Road, Poole, Dorset
Incentive, 54 London Street, Reading, Berkshire RG1 4SQ
Inform Software, 3 Treesdale Close, Birkdale, Southport PR8 2EL
Interceptor Micros, Lindon House, The Green, Tadley, Hampshire
Interceptor Software (see Interceptor Micros)
Interstella Software, 82 New Forest Drive, Brockenhurst, Kent
ITS Software, 30a Dyer Street, Cirencester GL7 2PF
KJ Gouldstone, 45 Burleigh Avenue, Wallington, Surrey SM6 7JG
JK Greye Software, 16 Park Street, Bath, Avon BA1 2TE
J Redman, Stevelon House, Slade Lane, Tarnock, Axbridge, Somerset
JRS Software, 19 Wayside Avenue, Worthing, Sussex BN13 3JH
Kemp, 43 Muswell Hill, London N10 3PN
Keysoft, 6 Bruce Grove, Tottenham, London N17
Kosmos Software, 1 Pilgrims Close, Harlington, Dunstable, LU5 6LX
Kuma Computers, 12 Horseshoe Park, Pangbourne, Berkshire RG8
Learning Systems, 11 Warwick Court, Princes Drive, Harrow, Middx
Legend, PO Box 435, London E4 7LX
Leisure Genius, 3 Montague Row, London W1H 1AB
Lerm, 10 Brunswick Gardens, Corby, Northamptonshire
Level Nine, PO Box 39, Weston Super Mare, Avon BS24 9UR
Llainlan Software, Pontyberem, Llanelli, Dyfed, Wales
Llamasoft, 49 Mount Pleasant, Tadley, Hampshire
Longman, Longman Group, Longman House, Harlow, Essex CM20
Lothlorien, 56a Park Lane, Poynton, Stockport, Cheshire SK12 1RE
Macmillan Software, 4 Little Essex Street, London WC2R 3LF
Manor Software, 24 Manor Gardens, London SW20

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Software Publishers

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Manx Tapes, Garey Veg, Glen Audlyn, Ramsey, Isle of Man
Martech Games, 9 Billingburgh Road, Eastbourne, East Sussex BN20
Mastertronic, (as for Mastervision)
Mastervision, 8-10 Paul Street, London EC2A 4JH
McGraw Hill, Shoppen Hangers Road, Maidenhead, Berkshire
Medidata, PO Box 26, London NW9 9BW
Melbourne House, Castle Yard House, Castle Yard, Richmond TW10
Metacomco, 26 Portland Square, Bristol BS2 8RZ
Michael Slatford, 3 Campden Road, South Croydon, Surrey CR2 7EQ
Microdeal Ltd, 41 Truro Road, St Austell, Cornwall PL25 5JE
Micro Dealer UK, Unit 6 Marlborough Road Trading Estate, Lattimore Road, St Albans, Hertfordshire
Micro Wish, PO Box 15, Colne, Lancashire BB8 9DB
MicroAPL, Unit 1F, Nine Elms Industrial Estate, 87 Kirtling Street, London SW8 5BP
Microbyte, 19 Worcester Close, Lichfield, Staffordshire
Microcosm, 68 The Glade, Clayhall, Ilford
Microdeal, 41 Truro Road, St Austell, Cornwall PL25 5JE
Micromania, 14 Lower Hill Road, Epsom, Surrey KT19 8LT
Micromega, 230/236 Lavender Hill, London SW11
Microsphere, 72 Rosebery Road, London N10 2LA
Mikro-Gen, 44 The Broadway, Bracknell, Berkshire RG12 1AG
Millenium Software, 17 Whitehouse Drive, Kingstone, near Hereford
Minatron Computing, 34 Pinewood Close, Westbury-on-Trym, Bristol
Mind Games, Liberty House, 222 Regent Street, London W1
Mirrorsoft, PO Box 50, Bromley, Kent BR2 9TT
Monitor Software, Suite 11, 526-8 Watford Way, London NW7
Monolith, Lector Court, 151 Farringdon Road, London EC1
Mosaic, 187 Upper Street, London N1 1RQ
MW Gamesworld, 12 Lawnswood Avenue, Chasetown, Walsall WS7
Myrmidon Software, PO Box 2, Tadworth, Surrey, KT20 7LU
Naigram Software, c/o Soho Synth House, 18A Soho Square, London
Nectarine, 837 Yeovil Road, Slough SL1 4JH
New Generation Software, FREEPOST, Bath BA2 4TD
Newsoft, 12 White Broom Road, Hemel Hempstead, Hertfordshire
Oasis Software, 12 Walliscote Road, Weston-Super-Mare, Avon
Ocean Software, 6 Central Street, Manchester M2 5NS
OCP, 77a Packhorse Road, Gerrards Cross, Buckinghamshire SL9 8PQ
Odin Software, The Podium, Steers House, Canning Place, Liverpool
Orpheus Ltd, Unit 1, Church Farm, Hatley St George, Near Sandy, Bedfordshire SG19 3HP
Orwin Software, 26 Brownlow Road, Willesden, London NW10 9QL
Palace Software, The Scala, 2nd Floor, 275 Pentonville Road, London
Partyline Ltd, 216-218 Homesdale Road, Bromley, Kent BR1 2QZ
PD Visual Marketing, Thanet House, Craven Road, London W2
Penguin, 536 King's Road, London SW10
Phipps Associates, 172 Kingston Road, Ewell, Surrey
Phoenix Publishing, 14 Vernon Road, Bushey, Hertfordshire WD2 2JL
Picturesque, 6 Corkscrew Hill, West Wickham, Kent BR4 9BB
Pitch Associates, 39 Rockleigh Avenue, Leigh-on-Sea, Essex
Pocket Money Software, Central Solutions Ltd, 500 Chesham House, 150 Regent Street, London W1R 5FA
Pooter Games, 24 Parsloes Avenue, Dagenham RM9 5NX
Poppysoft, The Close, Common Road, Headley, Newbury, Berkshire
Positive Image Software, 129 Dumbarton Road, Glasgow
Print 'n' Plotter Products, 19 Borough High Street, London SE1 9SE
Protek Computing, 1a Young Square, Brucefield Ind Park, Livingston, West Lothian
Psion, 2 Huntsworth Mews, Gloucester Place, London NW1
PSS, 452 Stoney Stanton Road, Coventry CV6 JDG
Pulsonic, Warwick Distribution Ltd, 3 Standard Road, Park Royal, London NW10 6EX
Q-Soft, PO Box 90, Barnet, Hertfordshire EN5 5RN
Quest International Computer Systems, Gillingham House, 38-44 Gillingham Street, London SW1
Quicksilva, Liberty House, 222 Regent Street, London W1
Radar Games, 53 Flavel Street, Woodsetton, Dudley DY1 4NU
RAM Writer, 3 Vumba House, 2 Cedar Gardens, Sutton, Surrey
Ramtop Services, 5 Rue D'Artois, 75008, Paris, France
Realtime Software, Prospect House, 32 Sovereign Street, Leeds LS1
Red Shift, 12c Manor Road, Stoke Newington, London N16 5SA
Richardson Institute for Conflict and Peace Research, Dept of Politics, University of Lancaster LA1 4YF
Romantic Robot, 77 Dyne Road, London NW6 7DS
Rose Software, 148 Widney Lane, Solihull, West Midlands
Runesoft, Charnwood House, Crossgate Drive, Nottingham NG2 TLW
Sentient Software, Branch House, 18 Branch Road, Armley, Leeds
Scisoft, 5 Minister Gardens, Newthorpe, Eastwood, Nottingham NE16
SCR Adventures, 190 Shelbourne Road, Tottenham, London
SD Microsystems, PO Box 24, Hitchin, Hertfordshire SG4 0AE
Selec Software, 37 Councillor Lane, Cheadle, Cheshire
Serim Software, Freepost, Dept SU7, PO Box 163, Slough, Berkshire
Shadowsoft, 70 Gooseacre, Cheddington, Bedfordshire
Shards, Suite G, Roycraft House, 15 Linton Road, Barking, Essex
Shepherd Software, Elm House, 23-25 Elmshott Lane, Chippenham, Slough, Berkshire
Silversoft, London House, 271/273 King Street, London W6 9LZ
Sinclair Research, 25 Willis Road, Cambridge CB1 2AQ
666, PO Box 190, Maidenhead, SL6 1YX
Slogger Software, 215 Beacon Road, Chatham, Kent
Softschool, 471 Hornsey Road, London N19 3QL
Soft Tech, 31 Lampits, Hoddesdon, Hertfordshire
Softek International Ltd, 12/13 Henrietta Street, London WC2E 8LH
Softel, 5 Durward Drive, Glenrothes, Fife KY6 2LB
Softly Softly, 36 Broadlands Road, Bromley, Kent
Software Cottage, 19 Westfield Drive, Loughborough, Leicestershire
Software Farm, 3rd Floor, 16 Charlotte Street, London W1
Software Projects, Bear Brand Complex, Allerton Road, Woolton, Liverpool, Merseyside L25 7SE
Spartan CC, 29 Feltham Avenue, East Moseley, Surrey KT8 9BJ
Spectadraw, I Cowleaze, Chinnor, Oxfordshire OX9 4TD
Spectrasoft, Capital House, Market Place, London W3 6AL
Spoof Software, 58 Railway Road, Urmston, Manchester M31 1XT
St Bride's, Burtonport, County Donegal, Ireland
Star Dreams, 17 Barn Close, Seaford, East Sussex, BN25 3EN
Startersoft, 32 Parkfields, Chippenham, Wiltshire
Statesoft, 29 Burrowfield, Welwyn Garden City, Hertfordshire
Stell Software, 36 Limefield Avenue, Whalley, Lancashire BB6 9RJ
Sterling Software, Garfield House, 86/88 Edgeware Road, London, W2
Stratagem Cybernetics, 286 Corbin Place, 2E, Brooklyn, New York 11235
Sulis Software, 4 Church Street, Abbey Green, Bath BA1 1FP
Sunshine Books, 12/13 Newport Street, London WC2
Sussex Publication, Townsend Poulshot, Devizes, Wiltshire SN10 1SD
System 3, South Bank House, Black Prince Road, London SE11
Talent Computer Systems Curran Building, 101 St James Road, Glasgow G4 0NS
Taskset, 13 High Street, Bridlington, Yorkshire YO16 4PR
Tasman Software, 17 Hartley Crescent, Leeds LS6 2LL
Temptation Software, 27 Cinque Ports Street, Rye, East Sussex
Terminal Software, Derby House, Derby Street, Bury BL9 0NW
Texgate, 14 Brook Lane, Corfe Mullen, Wimbourne, Dorset
The Edge, 31 Maiden Lane, Covent Garden, London, WC2E 8LH
Think Tank, 35 Wellington Road, Wimbledon Park, London SW19
Thor Computer Software, Erskine Industrial Estate, Liverpool L6 1AP
Timedata, 16 Hemmells High Road, Laindon, Basildon, Essex SS15
Total Computability, 45 Ewart Street, Brighton BN2 2UP
Transform, 41 Keats House, Porchester Mead, Beckenham, Kent
Tutorial Software, 'Vilands', Glasllwch Lane, Newport, Gwent NP1
Ultimate Play the Game, The Green, Ashby de la Zouch, Leicestershire
Unicorn Micro Systems, 312 Charminster Road, Bournemouth BH8
University Software, PO Box 383, London N6 5UP
US Gold, Unit 10, The Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY
Vega Space Systems, 28 Watford Road, St Albans AL1 2AJ
Virgin Games, 2-4 Vernon Yard, London W11
V0², 9-10A The Bridge, Walsall, West Midlands
Vortex software, Vortex House, 24 Kansas Avenue, off South Langworthy Road, Salford, M5 2GL
Westway, 24 Preston Road, Lytham, Lancashire FY8 5AA
Widget Software, 48 Durham Road, London N2 9DT
Winters, 24 Swannington Close, Cantley, Doncaster, South Yorkshire
Woosoft, 5 Andrews Close, Robertsbridge, Sussex TN32 5PB
Workforce, 140 Wilsden Avenue, Luton, Bedfordshire
Wyvern Software, 2 Princes Building, George Street, Bath BA1 2ED

ZXWORD SOLUTION

Across

5. Spec
7. Local Area
9. Errata
10. Wait time
15. Feedback
16. Cycles
17. Ampere
18. Tuning in
21. Continue
23. Lap-top
24. Core Plane
25. Norm

Down

1. Alter
2. Score
3. Data statement
4. Network
5. Slot
6. Cone
8. Silicon Valley
11. Germs
12. Adder
13. Icons
14. Media
18. Telecom
19. Atlas
20. Upper
21. Cyan
22. Term

EACH GAME has been awarded a star rating, the basis of which is value for money. Programming, graphics, speed, presentation and addictive qualities are taken into account.

Guide to ratings:
★★★★★24 carat. Buy it
★★★★Value for money
★★★Nothing special
★★Over-priced
★A rip-off

SPECTRUM 16K

Adventure

Planet of Death	Artic	3★

Arcade

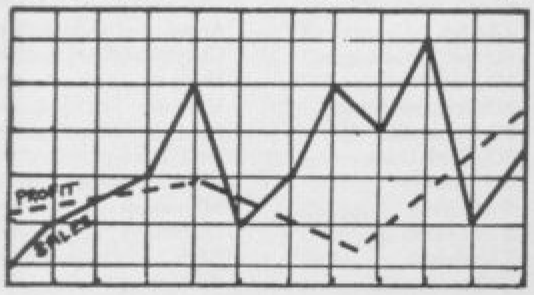
Arcadia	Beau Jolly	3★
Arcadian	J K Greye	3★
Blind Alley	Sunshine	4★
Cosmic Guerilla	Crystal	4★
Crazy Cranes	Voyager	3★
Crevasse and Hotfoot	Microsphere	4★
Cyber Rats	Silversoft	4★
Death Chase	Micromega	3★
Earth Defence	Artic	3★
Escape	New Generation	4★
Fireflash	Abacus	3★
Fruit Machine	DK'tronics	3★
Galaxians	Artic	3★
Gnasher	Mastertronic	2★
Godzilla and Martians	Temptation	4★
Ground Attack	Silversoft	3★
Horace and the Spiders	Sinclair	4★
Horace Goes Skiing	Sinclair	3★
Hungry Horace	Sinclair	4★
Invasion Force	Artic	4★
Jet Pac	Ultimate	5★
Luna Crabs	Micromega	4★
Maze Chase	Hewson	4★
Meteor Storm	Quicksilva	4★
Meteoroids	DK'tronics	4★
Micro Mouse	Lothlorien	3★
Mined Out	Quicksilva	4★
Mr Wong's Loopy Laundry	Artic	3★
Muncher	Silversoft	3★
Orbiter	Silversoft	4★
Pengy	Micromania	2★
Planetoids	Sinclair	3★
Proteus	Abacus	3★
Rider	Virgin	3★
Road Toad	DK'tronics	4★
Sentinel	Abacus	4★
Sir Lancelot	Melbourne House	4★
Space Intruders	Quicksilva	4★
Space Raiders	Sinclair	3★
Spec. Scramble	Work Force	4★
Spectipede	Mastertronic	3★
Spectral Invaders	Bug-Byte	4★
Spectral Panic	Hewson	3★
Strike Four	Spectresoft	2★
Tank Battle	dk'tronics	4★
Train Game	Microsphere	5★
Winged Warlord	CDS	3★
Yomp	Virgin	4★

Business

Finance Manager	OCP	5★
Survey II	Lobos	3★
Vu-Calc	Sinclair	4★
Vu-File	Sinclair	4★

Education

Chess Tutor	Artic	4★
Estimator Racer	Psion	4★



Firework Music	Soft Cottage	4★
Integration	University	4★
Money	Poppy	4★
Number Painter	Psion	4★
Regression	University	4★

Language

Beta Basic	Betasoft	5★

Practical

Countries of the World	Hewson	4★
Cycle Planner	Medidata	2★
Map of the UK	Kuma	4★

Puzzle

Flippit	Sinclair	4★
Hanoi King	Contrast	4★
Lojix	Virgin	2★
Nowotnik Puzzle	Phipps	4★

Simulation

Air Traffic Controller	Hewson	3★
Airliner	Protek	3★
Golf	Virgin	4★
NightFlite	Hewson	3★
Print Shop	CCS	4★
Pro-Golf	Hornby	4★

Strategy

Dallas	CCS	3★
Dictator	DK'tronics	4★
Heathrow	Hewson	4★

Traditional

Bridge Tutor	CP Software	4★
Bridgemaster	Serin	5★
Las Vegas	Temptation	3★
Pool	Bug-Byte	4★
Reversi	Sinclair	4★

Utility

Auto Sonics	Buttercraft	3★
Basic Utilities	Jaysoft	3★
Dietron	Custom	3★
Disassembler	DK'tronics	4★
Editor/Assembler	Picturesque	4★
Extended Basic	CP Software	4★
FP Compiler	Softek	5★
Friendly Face	Monitor	4★
Letterfont	Allanson	4★
Machine Code Test Tool	OCP	4★
Master Toolkit	OCP	4★
MCoder	PSS	4★
Print Utilities	Sinclair	4★
Slow Loader	ELR	5★
Sound FX	DK'tronics	3★
Spec. Editor/ Assembler	Picturesque	4★
Spec. Monitor	Picturesque	4★
Spectrum Super Toolkit	Nectarine	4★
Supercode	CP	4★
Trace	Texgate	4★
TT-S	Timedata	4★

SPECTRUM 48K

Adventure

Abyss	CCS	3★
Adventure 1	Abersoft	3★
Alchemist	Beau Jolly	4★
Amulet	Sentient Software	2★
Ancient Quests	Mirrorsoft	4★
Ashkeron	Mirrorsoft	3★
Assignment East Berlin	Sterling Software	2★
Atlas Assignment	Virgin	4★
Black Crystal	Mastervision	4★
Black Planet	Phipps	4★
Bored of the Rings	Silversoft	5★
Caesar's Travels	Mirrorsoft	2★
Castle Blackstar	CDS	4★
Classic Adventure	Melbourne House	4★
Colditz	Phipps	4★
Colossal Caves	CP Software	4★
Confidential	Radar Games	4★
Crystal Frog	Sentient Software	3★
Crystal Quest	Pocket Money	5★
Curse of the Seven Faces	Imperial Software	3★
D. Mouse in Black Forest	Creative Sparks	4★
Dead at the Controls	Artic	2★
Demon Lord	MCE	3★
Detective	Arcade	4★
Diamond Quest	CCS	2★
Diamond Trail	Gilsoft	4★
Doomdark's Revenge	Beyond	5★
Dun Darach	Gargoyle	5★
Dungeon Master	Crystal Comp.	4★
Dungeons of Doom	Temptation	2★
El Dorado	Atlantis	4★
Emerald Isle	Level Nine	4★
Erik the Viking	Level Nine	4★
Espionage	Modular Resources	2★
Espionage Island	Artic	3★
Eureka	Domark	3★
Everest Ascent	Shepherd	3★
Eye of Bain	Artic	4★
Fantasia Diamond	Hewson	4★
The Final Mission	Incentive	4★
Flight from the Dark	Hutchinson	4★
The Fourth Protocol	Century/Hutchinson	5★
Frankie goes to Hollywood	Ocean	5★
Frog Face	Positive Image	4★
Ghoulies	IMS Software	4★
Golden Apple	Artic	4★
Gremlins	Adventure Int	3★
The Great Space Race	Legend	2★
Halls of Things	Crystal Comp.	5★
Hampstead	Melbourne House	5★
The Helm	Firebird	4★
Here comes the sun	Alligata	4★
Heroes of Karn	Interceptor	3★
Hobbit	Melbourne House	5★
Ice Station Zero	8th Day	3★
Inca Curse	Artic	3★
Inferno	Shepherd	4★
Invincible Island	Shepherd	4★
Island	Crystal	2★
Jericho Road	Shards	4★
The Jewel of Power	Slogger Software	4★
Jewels of Babylon	Interceptor	2★
Jungle Adventure	CCS	2★
Kentilla	Micromega	3★
Key of Hope	Games Workshop	4★
King Arthur's Quest	Hill MacGibbon	2★
Knight's Quest	Phipps	3★
Leopard Lord	Add-on	2★
London Adventure	Fridaysoft	5★
Lords of Midnight	Beyond	5★
Lords of Time	Level Nine	4★
Mad Martha	Mikro-Gen	4★
Madcap Manor	Gilsoft	5★
Malice in Wonderland	Sentient Software	3★
The Magic Sword	Database Pubs	3★
Mountains of Ket	Incentive	4★
Morden's Quest	Melbourne House	5★
Murder at Manor	Gemtime	4★
Odyssey of Hope	Martech	3★
Operation Nightingale	Softly Softly	3★
Oracle's Cave	Doric	4★
Orc Slayer	Gamma Software	3★
Paradox	Runesoft	1★
Patch, The	Gilsoft	5★
Pay Off, The	Bignose	2★
Perseus and Andromeda	Channel 8	4★
Phineas Frogg	Mirrorsoft	4★
Pimania	Automata	4★
The Prince	CCS	4★
The Prisoner	Spoof Software	3★
Project X	Compass Software	4★
Quest	Hewson	4★
Quetzalcoatl	Virgin	4★
The Rats	Hodder/Stoughton	5★
Red Moon	Level 9	5★
Return of the Joystick	Delta 4	3★
Return to Eden	Level Nine	4★
Robin of Sherwood	Adventure Int	5★
Runestone	Games Workshop	4★
Runes of Zendos	Dorcas Software	3★
The Sandman Cometh	Star Dreams	4★
Satan's Pendulum	Minatron	4★
Scoop	Sentient Software	3★
The Secrets of St Bride's	St Bride's	5★
Se-Kaa of Assiah	Mastervision	2★
Sherlock	Melbourne House	5★
Ship of Doom	Artic	4★
Snowball	Level 9	5★
Sorderon's Shadow	Beyond	5★
Spoof	Runesoft	4★
Subsunk	Firebird	4★
Superspy	Shepherd	3★

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System 15000	Craig Comm.	5★
The Talisman	Games Workshop	4★
Temple of Vran	Incentive	4★
Terrormolinos	Melbourne House	5★
Timesearch	Millenium	3★
Tinderbox	Gremlin Graphics	1★
Tir Na Nog	Gargoyle	5★
Titanic	R&R	3★
Tower of Despair	Games Workshop	3★
Transylvanian Tower	Shepherd	3★
Twin Kingdom Valley	Bug-Byte	4★
Underworld	Orpheus	3★
Urban Upstart	Shepherd	4★
Valhalla	Legend	5★
Vampire Village	Terminal	2★
Velnor's Lair	Quicksilva	4★
Volcanic Dungeon	Mastervision	3★
Warlord	Interceptor	3★
War of the Worlds	CRL	2★
Waydor	IMS Software	2★
Width of the World	Mosaic	2★
The Wild Bunch	Firebird	2★

Arcade

Abu Simbel Profanation	Gremlin Graphics	4★
Action Biker	Mastertronic	1★
A Day in the Life	Micromega	4★
A View to a Kill	Domark	4★
Ad Astra	Gargoyle Games	4★
Adven. of a St Bernard	Mastertronic	4★
Airwolf	Elite	2★
Alcatraz Harry	Mastertronic	2★
Alien 8	Ultimate	5★
Android Two	Vortex	5★
Ant Attack	Quicksilva	5★
Arabian Nights	Interceptor	4★
Archon	Ariolasoft	2★
Arena 3000	Microdeal	3★
Armageddon	Silversoft	2★
Astro-Clone	Hewson	5★
Astronut	Software Projects	4★
Atic Atac	Ultimate	5★
Automania	Micro-Gen	3★
Avalon	Hewson	5★
Base Invaders	Work Force	3★
Battle Zone	Quicksilva	3★
Bazam	Alan Firminger	3★
Beach Head	US Gold	4★
Bear Bovver	Artic	4★
Birds and Bees	Bug-Byte	4★
Black Hawk	Creative Sparks	4★
Blade Alley	PSS	3★
Blue Max	US Gold	3★
Blue Thunder	Foundry Systems	3★
BMX Trials	Lainlan Software	2★
Booty	Firebird	4★
Boulder Dash	Front Runner	3★
Bounty Bob Strikes Back	US Gold	3★
Brian Bloodaxe	The Edge	4★
Brian Jack's Challenge	Martech	2★
Bristles	Statesoft	3★
Bruce Lee	US Gold	4★
Buck Rogers	US Gold	2★
Bugaboo	Quicksilva	4★
Buzz Off	Electric	3★
Caesar the Cat	Mirrorsoft	4★
Carnival	Eclipse	3★
Carpet Capers	Terminal	3★
Cauldron	Palace	5★
Cavelon	Ocean	4★
Centipoid Plus 3	Orwin	3★
Chaos	Games Workshop	4★
Chequered Flag	Sinclair	5★
Chimera	Firebird	5★
Chinese Juggler	Ocean	3★
Chocolate Factory	Hill MacGibbon	3★
Chuckie Egg	A & F	5★
Chuckie Egg II	A & F	3★
Chuckman	CCI/Add-on	4★
Close-In	Pulsonic	2★
Codename Mat	Micromega	5★
Codename MAT II	Domark	3★
Confuzion	Incentive	4★
Corridors of Genon	New Generation	5★
The Covenant	PSS	2★
Crusoe	Automata	3★
Cyclone	Vortex	4★
Cylu	Firebird	4★
Daley's Decathlon	Ocean	5★
Daley's Super-Test	Ocean	4★
Dangermouse in D. Trouble	Creative Sparks	4★
Death Chess 5000	Artic	4★
Death Star Interceptor	System 3	1★
Defusion	Incentive	3★
Defusion/Worms	K-Tel	2★
Demon Chase	Mansfield	2★
Deus Ex Machina	Automata	5★
Devil Rides In	Mastertronic	4★
Dimension Destructors	Artic	4★
Dodge City	Phoenix	4★
Don't Buy This	Firebird	2★
Dr Franky and the Monster	Virgin	3★
Dragonfire	Cheetahsoft	3★
Dragontorc	Hewson	4★
Driller Tanks	Sinclair	2★
Drive In	Fantasy	2★
Dynamite Dan	Mirrorsoft	5★
Energy 30,000	Elm	2★
Eric and the Floaters	Sinclair	3★
Everyone's a Wally	Mikro-Gen	4★
Exodus	Firebird	2★
Falcon Patrol II	Virgin	3★
Falklands Crisis	Lainlan Software	2★
Fantastic Voyage	Quicksilva	4★
Fighting Warrior	Melbourne House	4★
Frankenstein 2000	Icon	2★
Frank N Stein	PSS	4★
Fred	Quicksilva	3★
Froot Loop	NTD Software	3★
Galaxy Attack	Sunshine	2★
Ghostbusters	Activision	4★
Ghost Rider	Positive Image	2★
Giant's Revenge	Thor	2★
Gift from the Gods	Ocean	3★
Gilligan's Gold	Ocean	3★
Glass	Quicksilva	4★
Glug Glug	CRL	3★
Go To Hell	666	3★
The Guardian	PSS	3★
Havoc	Dynavision	1★
Harry Goes Home	Pulsonic	3★
Helichopper	Firebird	2★
Hellfire	Melbourne House	4★
Herbert's Dummy Run	Mikro-Gen	4★
Hickstead	CCS	2★
High Noon	Work Force	5★
Highway Encounter	Vortex	5★
Hunchback	Ocean	4★
Hunchback II	Ocean	3★
Hypersports	Imagine	4★
Icicle Works	Statesoft	2★
Invasion Body Snatch.	Crystal	5★
Jack and the Beanstalk	Thor	3★
Jasper	Micromega	3★
Jet Set Willy	Software Projects	5★
Jet Set Willy II	Software Projects	3★
Jump Challenge	Martech	3★
Killer Knight	Phipps	3★
Knight Lore	Ultimate	5★
Knockout	Alligata	2★
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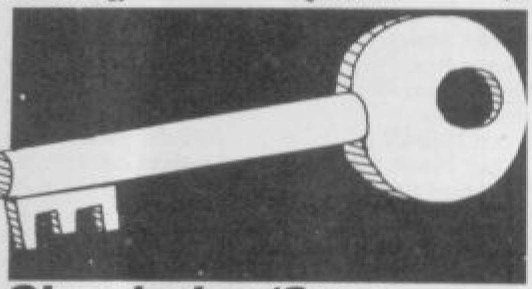
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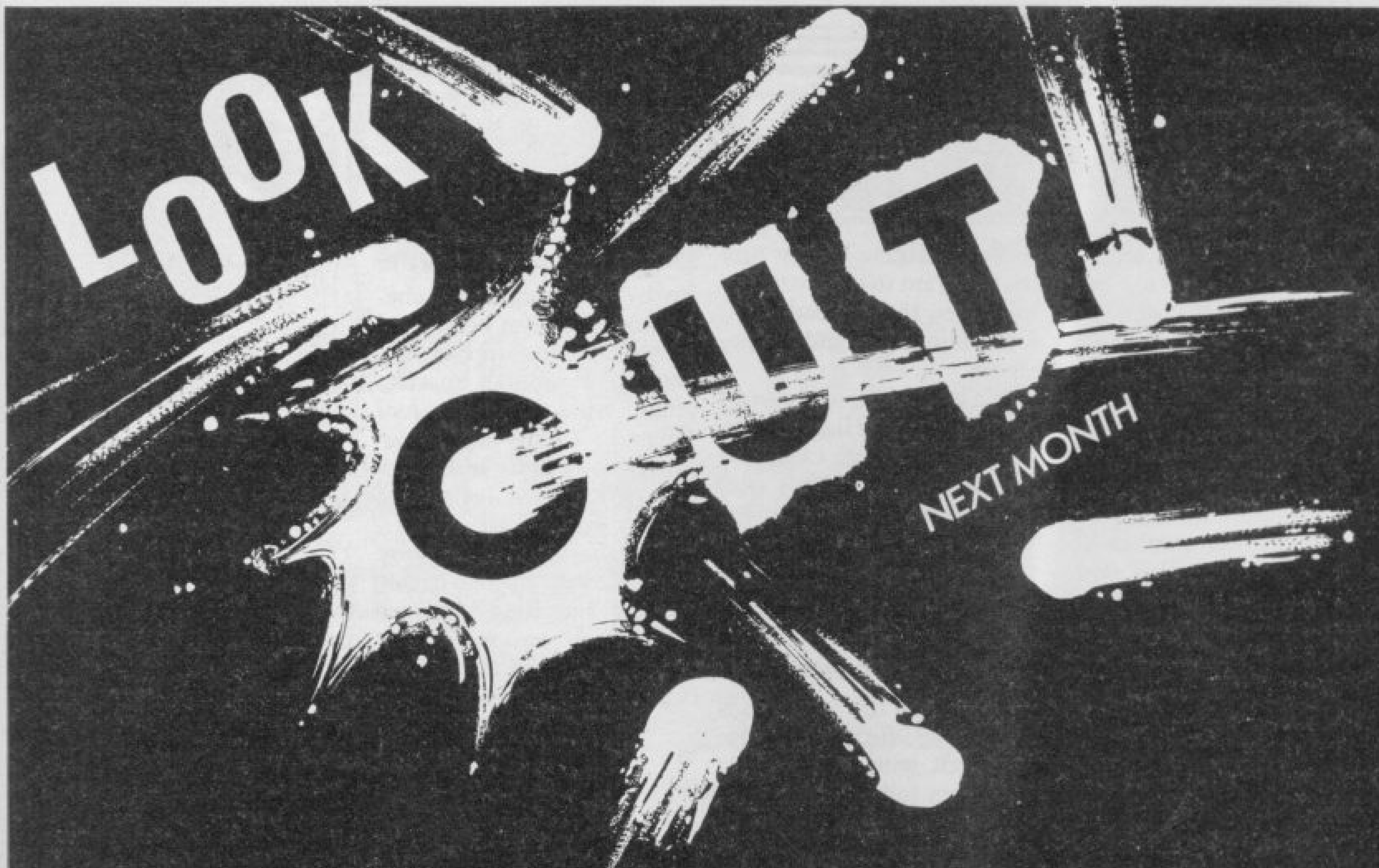
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Goodbye and hello . . .

GREMLIN bids a fond if belated farewell to wee **Craig Kennedy**, the demented celt who's been designing *Sinclair User* for the last 20 months or so. His exaggerated contributions to Slugger's anatomy will be sadly missed. Rat fancier Craig's seat is filled by **Gareth Jones**, another demented celt. Is this wise, asks Gremlin . . ?

Bloody Chambers

Craig has since joined *Computer and Vegetable Games*, and was promptly roped in for a pitched battle with **Clement** 'sex symbol' **Chambers** and his gang at **CRL**. Our Clem challenged the ageing comic to one of those 'military' games which seem to be all the rage in yuppieland where teams of young execs shoot yellow paint capsules at each other.

Citations go to *Meat and 2 Veg* editor **Tim** 'Spaniel eyes' **Metcalfe**, who now earns the briefer soubriquet 'repellent' for the way the bullets kept bouncing of his hairy chest . . .



Mirrorsoft serfs attempt to give a balloon ride to the winners of the Dynamite Dan competition. If only they'd brought along Paul 'Hermit' Duffy with his inexhaustible supply of hot air . . .

Young and beautiful

What the repellent Metcalfe probably needs is the **Hisoft Organically Grown Wholefood Expert System**. "Are you another overweight, bad tempered journalist living on junk food, black coffee and 30 a day?" asks Hisoft. Thirty a day? You must be joking! Still, it grabbed Gremlin by the fur on his tongue . . .

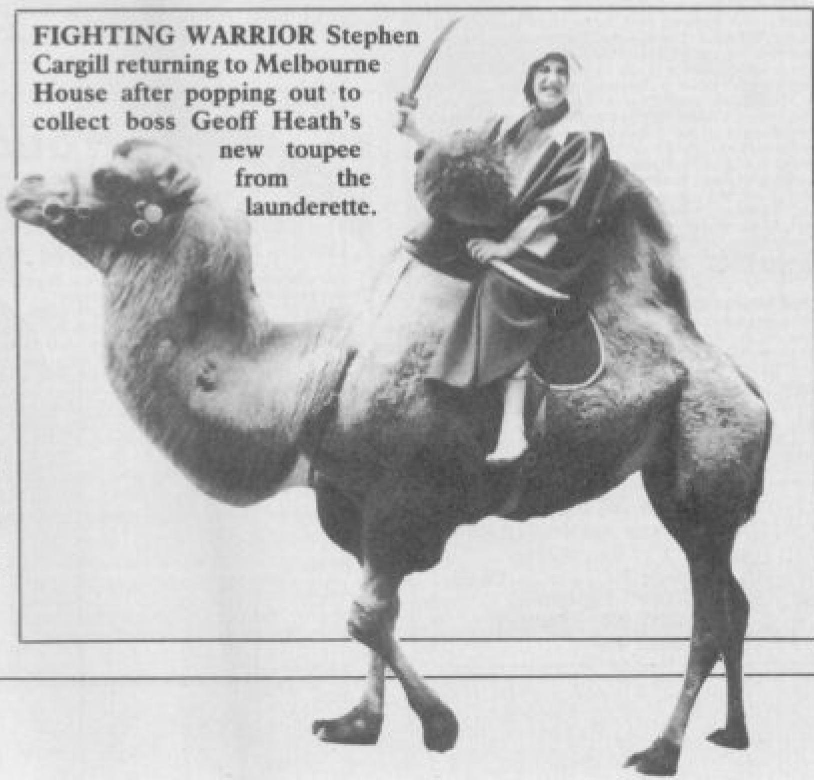
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It's wonderful to see small companies like Hisoft bringing the sort of care and attention to Gremlin's personal problems which the **Ward Empire** has brought to international relations with **Raid over Moscow** and **Rambo** . . .

Artistic licence

The battle of the paintpots is hotting up. First came **Tim Langdell** with **The Artist**. That was followed hotly by **OCP**'s **Art Studio**.

Now we discover that OCP is flogging the rights to **Art Studio** to youthful **Herbie Wright** at **Firebird**. Can this be, ponders Gremlin, anything to do with Langdell's threatened intention to fight back with **The Artist II**?



FIGHTING WARRIOR Stephen Cargill returning to Melbourne House after popping out to collect boss Geoff Heath's new toupee from the launderette.

Beyond the grave

Buzby's bulging chequebook has also been hard at work buying up **Beyond**. But do Firebird's masters realise what they're in for? Beyond's **Clive** 'toad-thing' **Bailey** has a nasty little sideline of his own in writing fantasy gamebooks.

The Forbidden Gateway series is a saga of such occult vileness that one wonders what goes on in Clive's mind. Worst of all are the bogies, which Clive says are Scottish, and suck out your life-force. Through the nose, presumes Gremlin. Or is it an elaborate satire on the hellish boardroom rituals at BT . . ?

Yesterday's news

If micro magazines form one big happy family, *Your Computer* is the old codger in the corner with senile dementia. Its latest wheeze consists of plastering 'Scoop' in big letters all over its November **Spectrum 128** 'review'. Close inspection of the copy reveals it all comes from 'our friends at MicroHobby', a Spanish weekly micro rag.

Chris 'lunchbreaks' **Bourne**, who endured a week of solid boozing on the Costa Brava to bring you the story last month, before the *YC* 'scoop', is understandably miffed. His impersonaton of a drowned rat at the Barcelona launch was so convincing as to persuade **Investronica** personnel to cough up all the technical details just to get him off their stand – one of the great pieces of investigative hackwork of our time. *Yawn Computing* didn't even mention the RAM discs.

"Utter wallies," growls Lunchbreaks into his early morning vodka. "They should stick to promoting baked beans . . ."



Nick Alexander and other political Virgins burying unsold Rabbit games while masquerading as Alliance bye-election candidates.

Dense foliage

Rampant paranoia seems to be behind the latest press release from **Knightsoft**. The company wins the **Brazen Backslappers of the Month Award** for its hyping of **Jungle Fantasy**.

"The first program the USA will try to emulate," it says, and claims it will make the US software industry obsolescent.

"It is an adventure it is graphical and it is animated," says Knightsoft, with breathless punctuation. "That is all we can reveal."

Further investigation uncovers a tale of cannibals, man-killing gorillas, king corbas (sic) and prehistoric terradactyles (ditto).

Knightsoft has inveigled some clapped-out new wave band called **Bamm-Boo** to write music for it. "Program sales in excess of one million are expected across the world."

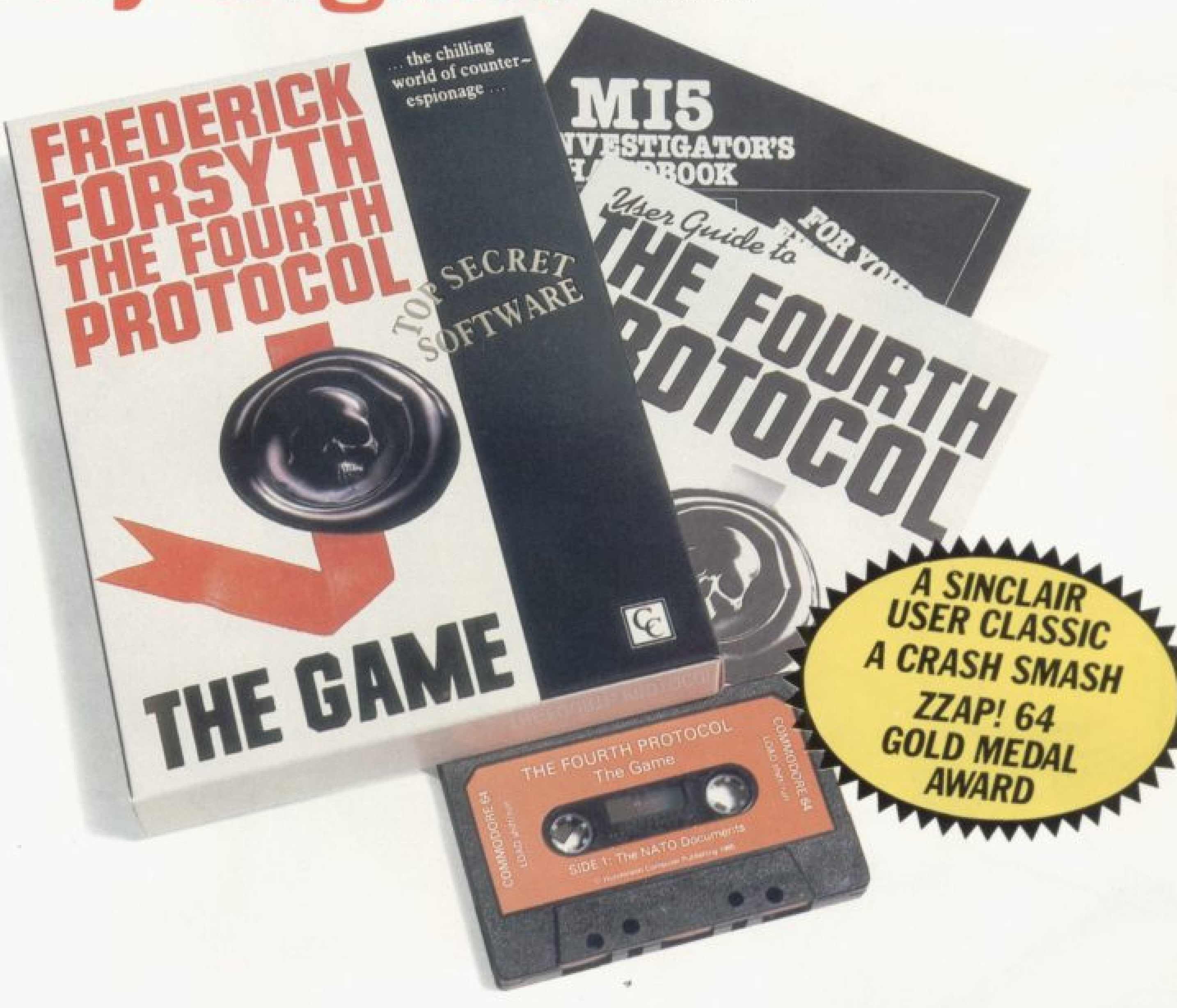
Come back **Haresoft**, all is forgiven . . .

"Destined to become one of the all time classic games" SINCLAIR USER

"An absolute joy" ZZAP! 64

"A must for adventure enthusiasts" PERSONAL COMPUTER WORLD

"Truly original" CRASH



After reviews like that, what more can we say?

"I think the best thing to say about this game is BUY IT!" ZZAP! 64

Frederick Forsyth's THE FOURTH PROTOCOL – THE GAME is available on cassette for the Spectrum and CBM64 at £12.95 and on disk for the CBM64 at £15.95. Published by Century Communications, a division of Century Hutchinson Ltd. Brookmount House, 62-65 Chandos Place, London WC2N 4NW